



A Hacker designed cruiser, powered with a 40 h.p. Kermath motor, owned by Jack Farr of Detroit, Mich.

Contents for April 1922

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1922 Racing Dates

- June 17—Thirteenth Annual Race, Chicago to Michigan City,
Columbia Yacht Club.
July 1-4—Annual Regatta Miss. Valley Power Boat Association,
Peoria, Ill.

- July 8—New York to Block Island, Cruiser Race.
July 19-21—Inter-Lake Regatta, Put-in-Bay.
July 29—Scripps Trophy Long Distance Cruiser Race, Rocky
River to Put-in-Bay and return; auspices Cleveland Yacht
Club.
August 3-6—Chicago Pageant of Progress Regatta; Chicago
Yacht Club.
August 5—A. P. B. A. Handicap Cruiser Championship of
America.
August 10, 11, 12—Annual Regatta at Buffalo.
August 17, 18, 19—Races for Fisher-Allison Trophy, Royal Ham-
ilton Yacht Club, Hamilton, Ont.
August 26-September 5—Detroit Regatta for Gold Cup, Wood-
Fisher Trophy, etc.
September 3-7—Races at Toronto.

No Race for British International Trophy This Year

Commodore Judson of the Motor Boat Club of America has announced that the time for challenges for the British International Trophy, by the terms of the Deed of Gift, expired March first. As no challenge has been received there cannot be, in the absence of a further agreement, a race for the Trophy this year. It is possible that such a race may be held by common consent and there may be such a race for the possession of the Trophy between American boats.

The Trophy is now in the possession of the Detroit Yacht Club, having been won last year by Commodore Garfield A. Wood's Miss America II, in competition with the British challenger, Maple Leaf VII, at Detroit last fall.

Navigation Talks at Columbia Yacht Club

The Columbia Yacht Club has extended an invitation to all motor boatmen and others interested to attend a series of five illustrated talks on Small Boat Handling, Seamanship and Piloting, to be held at the Columbia Yacht Club, 86th Street and the Hudson River, New York City, on Monday evenings, beginning April 3rd, from 8:15 to 10 o'clock.

A list of the speakers and their subjects follows:
Monday, April 3—Rules of the Road; Rights of Way; Whistle Signals; Lights for All Classes of Boats.....C. F. Chapman
Monday, April 10—Buoya, aids to Navigation; Navigation Lights; Day Marks; Equipment; Government Publications

Monday, April 17—The Compass; Compass Errors and How to Apply Them; Reading and Using the Chart.....Commander H. A. Jackson
Monday, April 24—Nautical Instruments and Coastwise Piloting; Tides and Currents

Monday, May 1—The Weather and Predicting the Weather from a Yachtsman's Point of View; Flags; Colors, and How to Fly Them; Yachting Etiquette.....Commander A. B. Bennett, Washington, D. C.
Ladies are invited to attend.

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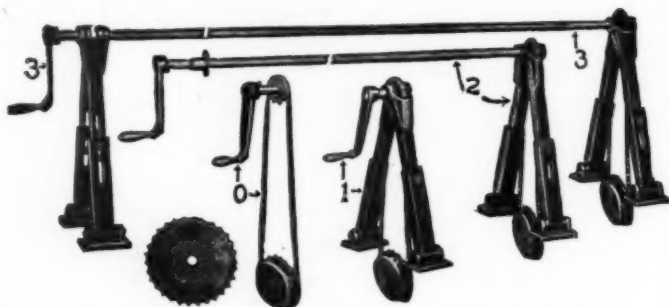
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Advertising Index will be found on page 130

Power

**3 H.P.
48 lbs.**

**Ole Evinrude's
New Motor**

The Most Powerful Light Weight Motor

Lightness of course is a desirable feature—and the Elto is light, weighing only 48 pounds. But what concerns yacht and power boat owners most of all is this: What will it do, clamped on the stern of a dinghy or rowboat?

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Write for name of the Elto dealer nearest you and copy of the Elto catalog.

Dealers: Write for prices and complete selling plan.

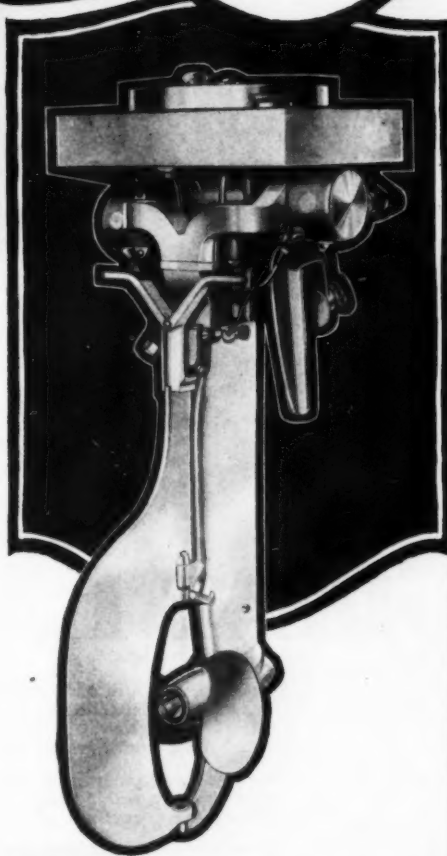
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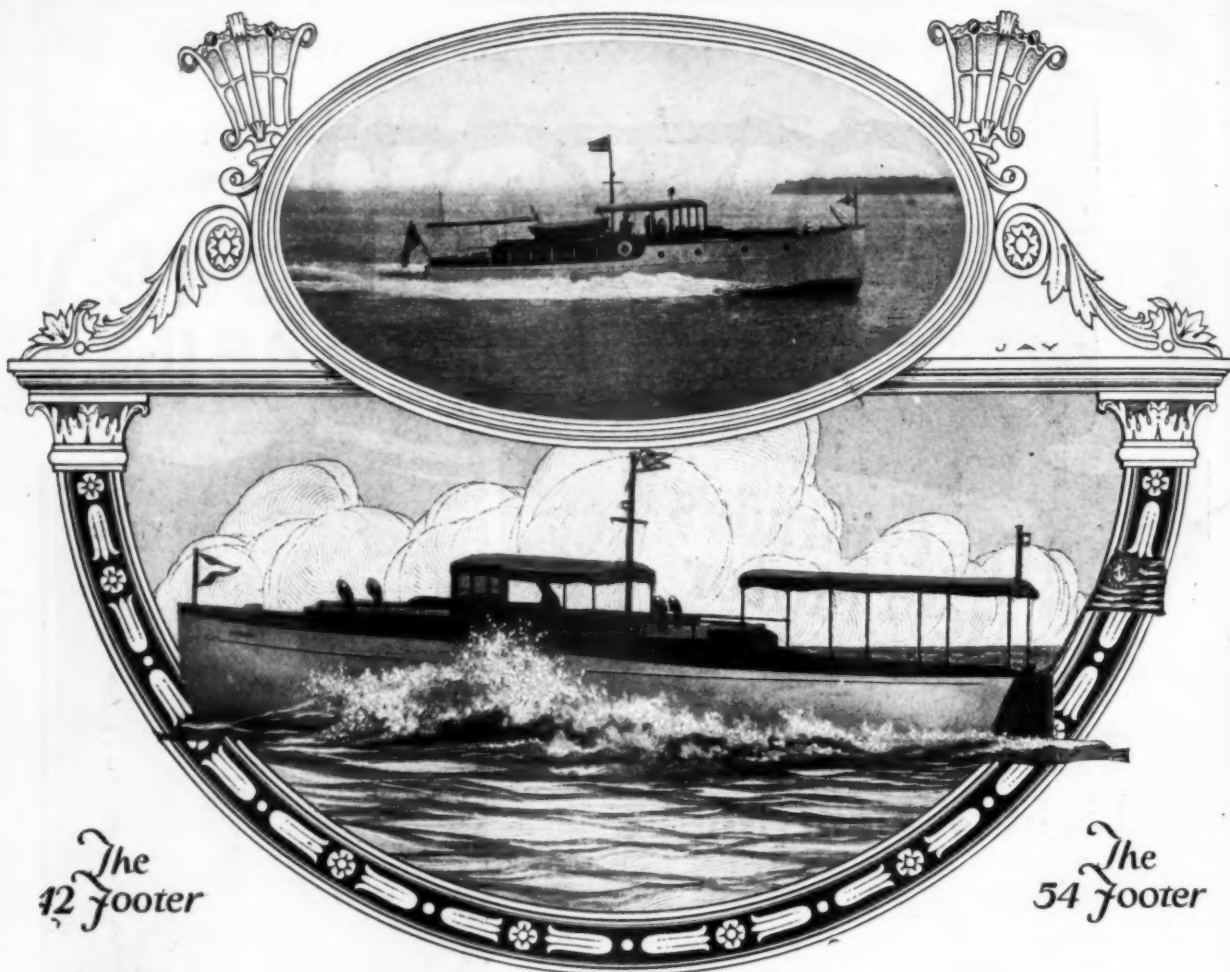
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GREAT LAKES CRUISERS

The shop schedule of the Great Lakes Boat Building Corporation covers the operation of two departments: One for the production of two standardized express cruisers in lengths of 42 feet and 54 feet; and the other for the building of boats to special design both in the express cruiser and slower or model type.

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The 42-foot Standardized Express Cruiser, powered with either single or twin screw engines, is an ideal boat for large parties for day cruising or a party of four for extended cruising. The large engine compartment with full headroom provides light, ventilation and easy access to the power plant.

Bulletin No. 339 on the 42-footer and Bulletin No. 210 on the 54-footer are available upon request.

If early delivery is an important factor prompt action should be taken in placing an order.

GREAT LAKES BOAT BUILDING CORP.
Milwaukee Wisconsin

Largest Builders of Express Cruisers in America

MOTOR BOATING

Photographs by M. Rosenfeld

119 West 40th St., New York, N. Y.



The gentle art of sand papering the hull is one which can readily be mastered by the ladies. Old gloves will protect fair hands

What Shall We Do This Spring?

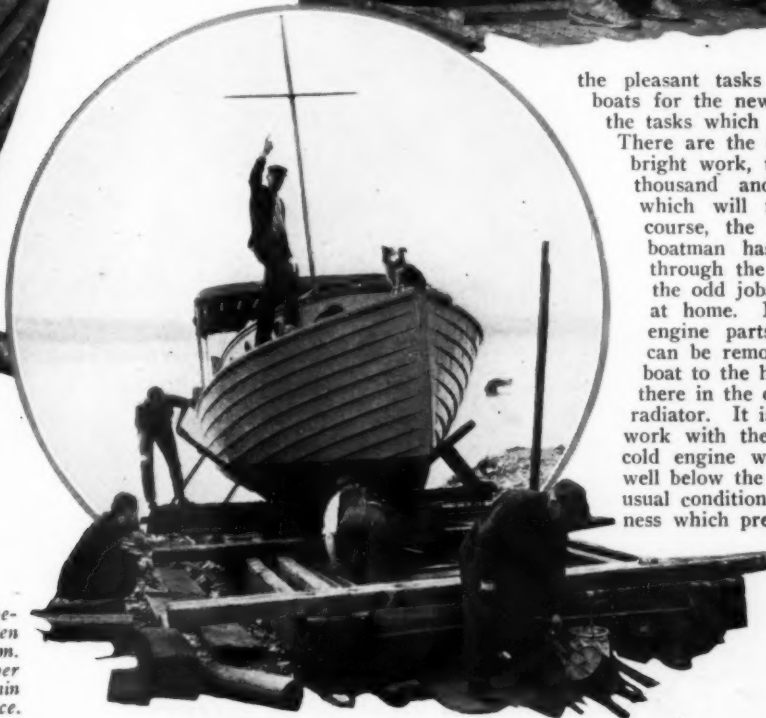
An Answer to the Many Questions Which Occur to Boatmen at Fitting Out Time Each Year

By F. W. Horenburger

ONCE again the rapid approach of the new boating season is heralded by a few prematurely warm spring days which occur before the winter has finally left us. These rouse the latent boating fever in the veins of all the true dyed-in-the-wool enthusiasts who must begin again



There is nothing like starting the young ones in the way that they should go



A final inspection just before launching will often catch a forgotten item. One thing to remember is to see that the drain plug is securely in place.

the pleasant tasks of preparing their boats for the new season. Many are the tasks which must be undertaken. There are the engine, the hull, the bright work, the plumbing, and a thousand and one other items which will need attention. Of course, the real genuine motor boatman has been working all through the winter on many of the odd jobs which can be done at home. Many such items as engine parts and small fittings can be removed bodily from the boat to the home and attended to there in the comfort of the steam radiator. It is no pleasant task to work with the bare hands on the cold engine with the thermometer well below the freezing point. The usual conditions of cold and dampness which prevail during the winter lay-up season are injurious to sensitive electrical apparatus. It is best to remove bodily the magneto, starting motor, and generator, together with sup-



An old saying: Many hands make light work



Scraping down the bright work is one of the biggest jobs on many boats. Sharp scrapers are necessary for good results

plementary ignition parts, such as the coil, and keep them at home where they will dry out thoroughly over the winter. It is an advantage to keep them in a warm room where all moisture will be driven from the coils of the machines. There is nothing which interferes more with the efficient operation of these units than dampness.

Perhaps most important of the many jobs which need doing at this time is the overhaul of the motor. For the very good reason that this is always a messy and dirty job, it is well to undertake this before beginning the painting of the hull proper. It is much easier to do all the cleaning down at one time after the motor is ready than it is to do the same work again through lack of sufficient foresight. It is a commonly accepted notion among many yachtsmen that the marine motor needs to be completely ripped apart each season in order to behave properly during its short season of service. This idea is entirely fallacious, as the average service requirements of the marine engine used for pleasure purposes on a boat are very moderate. Any marine motor worthy of the name should be durable enough to operate for at least three or four summer time seasons without requiring a rebuilding each spring. Naturally, the valves will need attention, and possibly some ends of wire will need to be renewed, and points of unusual wear, such as pump and



Be sure that all water connections are made up tight before going overboard

stuffing box packings, should be renewed during this time rather than later when the boat is in service.

The main and connecting rod bearings of a good marine motor are of sufficiently generous proportions, so that with proper lubricating arrangements they should last and keep in good condition for several years. Naturally, some will wear and need taking up. Should this be necessary, the first operation will be to determine just which ones need attention. Connecting rod bearings can be tested by raising the bearing with a lever through the hand



Aluminum bronze will brighten up the awning supports and is a task for the ladies

hole opening. If there is a slight trace of motion, this can be corrected by removing one or two of the thin shims which should be between the two halves of the bearing. After pulling the bolts up securely, the bearing should be tight and still permit the shaft to rotate with sufficient freedom. Another very good method of determining whether the bearings need attention is by means of a force pump which is screwed into the spark plug opening



Caulking cotton properly applied will prevent those old seams from leaking

Lucky is the man who can call on friend wife to lend a helping hand in the spring



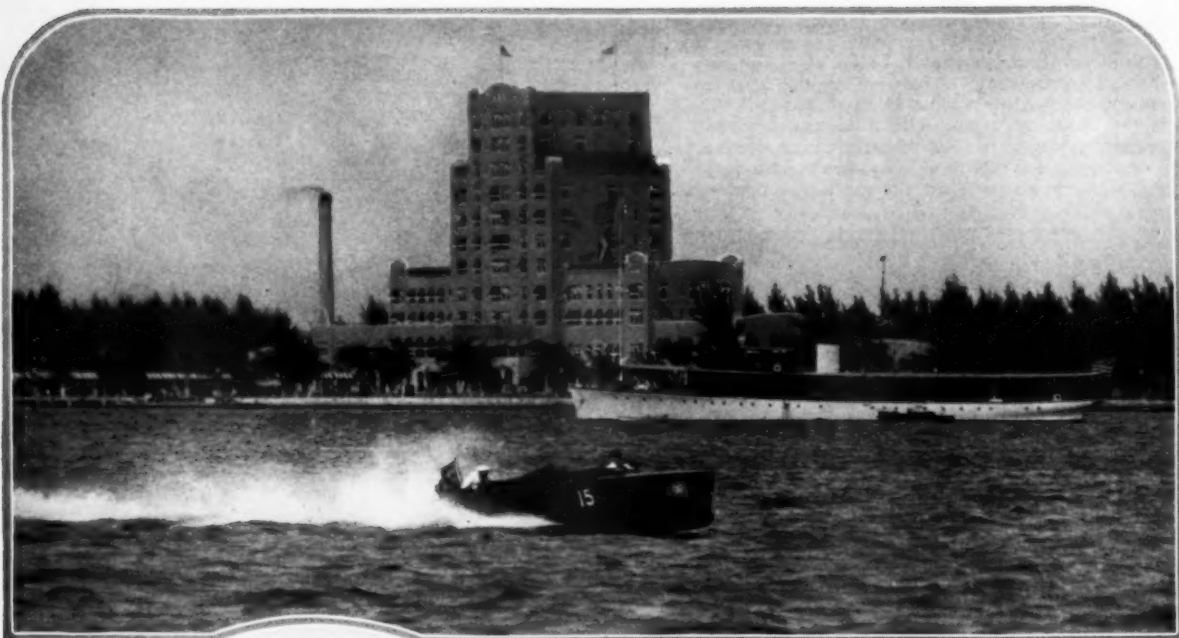
Marking off the water line is a delicate operation and must be done with care and patience

above the piston. By operating this pump so as to create an alternate pressure and suction on top of the piston, it will raise and lower the connecting rod on

the bearing sufficiently to locate any play. Should the main crankshaft bearings be found loose, there is no alternative but to pull the motor completely apart and refit the entire line.

One of the principal points requiring attention is the removal of carbon deposits on the cylinder head and pistons. This can be done by taking the heads down in the cases of such motors as permit this, or else scraping through valve openings or otherwise in those motors in which the heads do not come off. Piston rings are mainly responsible for excessive carbon, and deposits will be found heaviest in those cylinders in which the rings are faulty. Blowing past the rings, large quantities of oil will get into the combustion chamber and burn there, leaving a carbon deposit behind. It makes no difference what brand of oil is used; if excessive quantities of it get into the firing chamber, carbon will result. The remedy for this situation is the fitting of new rings and, should the cylinder be

(Continued on page 64)



Baby Gar, winner of the Wood-Fisher Trophy, going around the course at about a 50-mile-an-hour clip. The building in the background is the Hotel Flamingo, and the yacht is Thelma, a 138-footer



The Navigator and Captain (Gar Wood) as they tell us we looked while crossing the Gulf Stream in the race to Havana

Florida Regatta Proves Popular

More Than Sixty Boats Compete at Miami for the Fisher-Allison, Wood-Fisher and Many Other Trophies—Ocean Races to Palm Beach, Havana and Key West

By Charles F. Chapman

Photographs by the Author

WANTED: A few regular sportsmen who will give Gar Wood a real race. As it is now, the Commodore is alone by himself. He has all types of racing boats: cruisers, runabouts and hydroplanes, and is ready to race anybody, anywhere, any time, but there seems to be no one in the country who is game enough to make a try. Gar Wood's boats have won in every class in this country as well as abroad in which they have been entered, won fairly and squarely, in fact—they have defeated all comers so decisively that they have not come back for a return engagement. Gar Wood's supremacy has practically killed many forms of motor boat racing in this country. This has happened not so much because Gar Wood



Gar Jr. II taking a party of members of the Habana Yacht Club out for a sail on Cuban waters

is unbeatable, for he's not, but because Gar Wood prepares for every race with the idea of winning and starts in every race with only one thought in mind: to win. Up to date no sportsman has been found in this country who was willing to race the way Gar Wood races. They have all been beaten before they started.

The above summarizes what happened at the recent Southern regatta at Miami. There were as many boats eligible to race as ever before, in fact more, but their owners all had excuses and alibis to offer before the starts, principally because they assumed their craft would be beaten. Perhaps it was because they were not



Messrs. McBride, McLeod, Cornell, Chapman, Feld, Fischer, Müller Henning; Lower, Livingston, Stoltz, Schantz, Quigley, Chase.



Adieu, owned by Webb Jay, competing for the Wood-Fisher Trophy



Old Morro Castle, the first thing one picks up upon approaching Havana Harbor

game enough to finish anywhere but in first place and perhaps it was because their owners did not care to suffer the punishment that is always coming to the crew of a small express cruiser in such ocean races as they schedule at Miami. Even those cruisers which did start against *Gar Jr. II* in the ocean races had their owners missing from the crew, which condition took away from the events much of former competitive interest which had been present.

Such express cruisers as *Hoosier VI*, *Altonia I*, *Altonia II*, *Sea Horse*, *Shadow VI*, *Olalen*, and others, were all in commission and, with the pos-



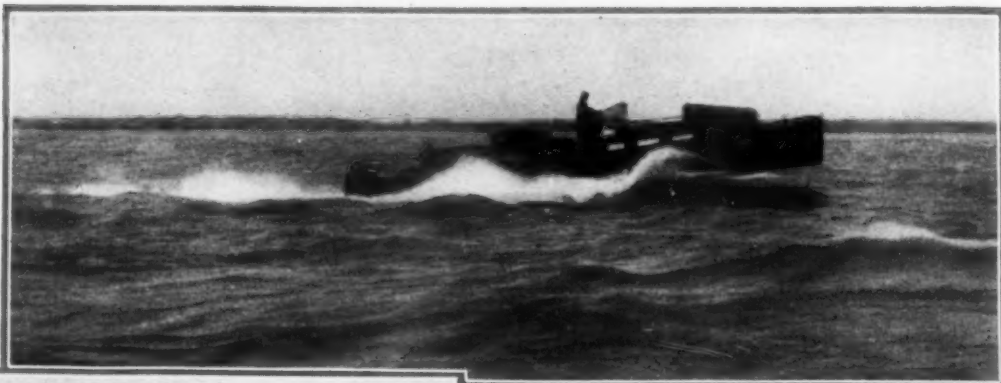
sible exception of *Altonia II*, were all in the pink of condition, but their owners would not permit their boats to race. Event after event had to be called off entirely or held with only two starters while the owners of eligible craft sat around with the judges reminiscing about past races.

The race for the famous Fisher Gold Trophy flivvered

Claude Grahame-White, of England, who was one of the crew of *Gar Jr. II* in the race to Cuba, talking with Commodore Schantz

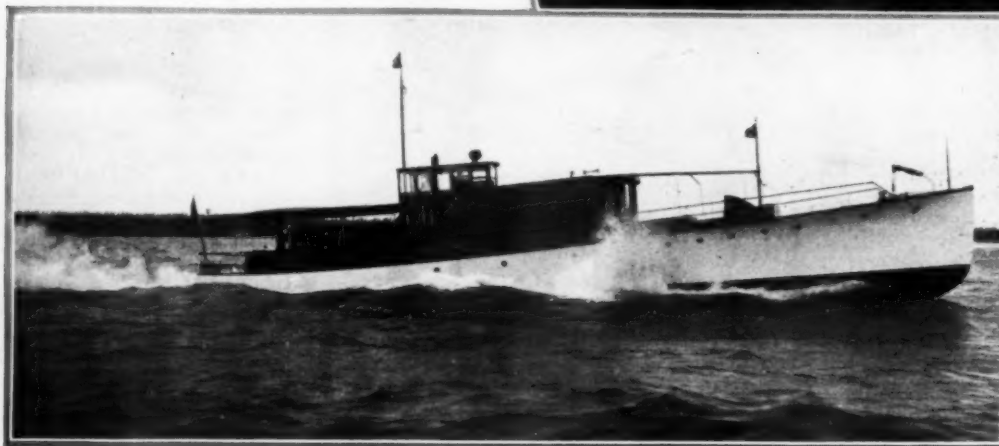
Shadow V in the race from Miami to Palm Beach and return

Captain Hughes and Win Wood who made up the crew of Shadow V in the race from Havana to Key West. So much salt water came aboard that the boys were literally "pickled"



his Rainbow for the race. The owner of Nick Nack would have liked to take his craft to Miami, but when he decided to go down he could not get hotel accommodations, it is said, so Commodore Birge called off the trip. The owner of Rainbow II, Harry Greening of Hamilton, had to go to California on a business trip, so his ship was not at the starting line. The same is true of the two Orlos, Orlo II and Orlo III; their owners could not get away from business in the North. Miss Peerless, owned by Ed Grim of Buffalo, was expected, but her owner also had to call it off at the last minute. And so it was—the best of prospects and intentions amounted to naught.

most miserably. There were only two boats ready to make a race, Adieu, owned by Webb Jay, and Carl Fisher's new runabout Aye Aye Sir II. The latter sank in a trial trip the day before the first heat and could not be "brought to" in time, so her owner ordered her shipped back to Detroit to be made ready for the next competition for this trophy, which is to be held at Hamilton, Ontario, next August. Adieu was ready and waiting, but none of the other boats in the country, eligible to give Adieu a race, showed up. Several reasons were given—the owner of the original Rainbow, which boat won the first leg on the trophy in the 1920 Detroit races and repeated again last August at Buffalo, with Commodore Eagan at the wheel, was too busy at his home in the North to give the necessary time to prepare



Commodore Peter Morales, and Rafael Posso of the Habana Yacht Club, greeting Gar Wood

Sea Horse, which finished third in the race to Palm Beach and return



The Habana Yacht Club. No one could have done more for the visiting yachtsmen than was done by the officers and members of the Habana Yacht Club. The hospitality and courtesy which were extended to the visitors outshone anything of a similar nature in this country.

The trophy went to Adieu. This was a perfectly proper procedure as her owner, Webb Jay, had gone to all the expense and trouble to prepare his craft for the race, had brought her down from Detroit solely for this race, and was at the starting line ready to run, but the Committee ruled that this would not be necessary. Therefore, Webb Jay takes the trophy for the second time. Only one more win by the same owner will be necessary to make the trophy his permanent property. At this time it rather looks as though Mr. Jay would turn the trick at Hamilton in August.

Adieu is a wonderful boat with lots of speed and if her staying qualities can only be perfected, the cup is as good as hers.

That which happened in the Fisher-Allison event as told above was repeated again in the scheduled race for the Wood-Fisher Trophy. The entries were Baby Gar, owned by Gar Wood, Aye Aye

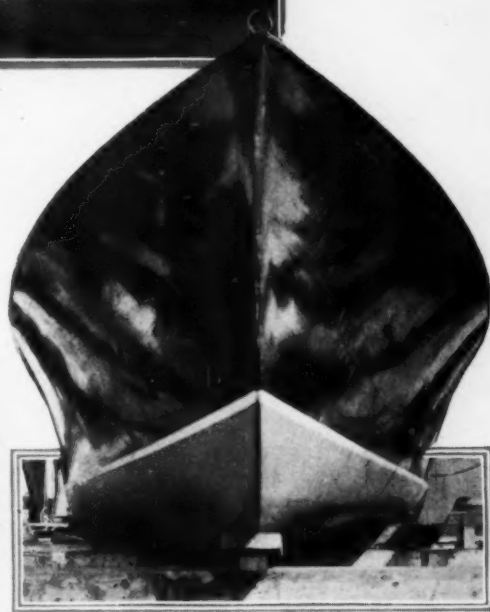


The fate of Aye Aye Sir II after one of her trial trips

Photograph by Russell Wright



A stern view of Aye Aye Sir II. As will be seen, a single surface propeller was used in this installation. It was placed in a sort of a tunnel extending several feet forward of the stern. A 2 1/4 inch steel shaft was used, but this did not prove sufficiently strong and broke on two occasions. The hole which the propeller cut in the boat's bottom after the shaft broke, can be seen



A bow view of Aye Aye Sir II, built especially to compete in this winter's races for the Fisher-Allison and Wood-Fisher Trophies

Sir II, owned by Carl Fisher, and to make the race more interesting to the public, Webb Jay consented to run his Adieu, although she would be outclassed, as Adieu is powered with an 8-cylinder Hall-Scott motor developing about 250 h. p., while Baby Gar has a 450 h. p. Liberty, and Aye Aye Sir II a 400 h. p. Allison.

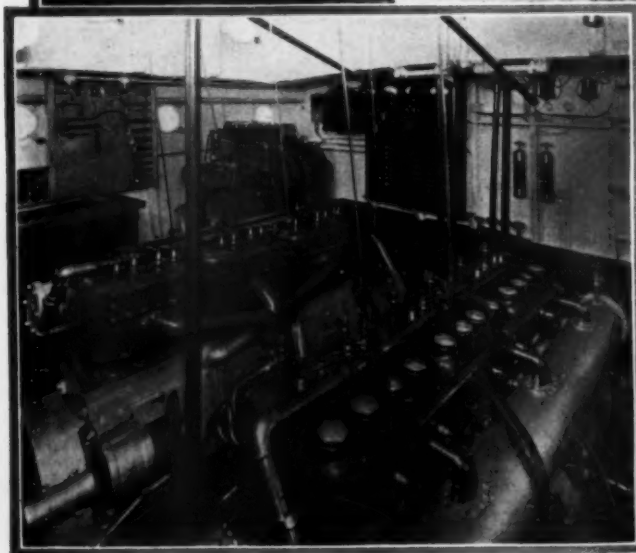
The sinking of Aye Aye Sir II put her out of the running, and the speed of Baby Gar put Adieu out of the running before the half way mark had been reached in any of the three fifty-mile heats. Oil pump failure, bursting of the exhaust line and too much oil were the causes. But even had everything remained intact, Baby Gar would have won, hands down. Adieu with her new motor wasn't the success that was anticipated. The hull was badly out of balance and from the best times she made in the race, when she was running right, Adieu did not make quite as good speed as last winter when she was powered with a 6-cylinder motor of the same make. It again proves that combination of hull and power plant must be right. The old combination in Adieu seemed to be as near correct as it is possible to get it in a boat of Adieu's design, but apparently all was spoiled by the new installation.

Baby Gar, as usual, ran perfectly. She ran off lap after lap with clocklike regularity. The motor was not touched during the three days of racing, fifty miles each day. As a

(Continued on page 114)



The convenient dining saloon is located in the forward deck house



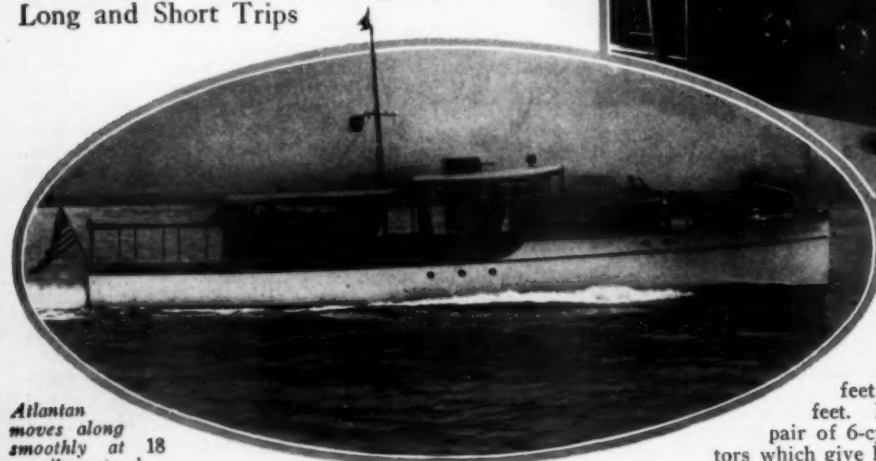
A pair of six-cylinder Model M Speedway motors occupy the engine room under the bridge deck



All motor controls are brought to the steersman's position

Atlantan, a 75-Footer

A Complete, Comfortable and Serviceable Combination Cruiser, Designed for Both Long and Short Trips



Atlantan moves along smoothly at 18 miles speed

THERE are many yachtsmen who cannot see a new boat design without being overcome with a desire to own that particular boat. A very attractive design was completed not long ago at the plant of the Consolidated Shipbuilding Corporation about the same time that J. H. Nunally happened in to visit C. G. Amory, the genial treasurer of the works. This design happened to be for a 75-foot cruiser of the type that could be successfully used in Florida waters, as well as one that embodied all the features necessary for northern sailing. Mr. Nunally, after inspecting and criticising the drawings, was possessed with a longing for this boat and decided that nothing else would do. The fact that he already had a high speed cruiser made no difference. An order was placed for the 75-footer to be built according to the newly prepared design. As a result, Atlantan was delivered to its new owner during December, and immediately set sail for Miami where the boat has been in service all through the winter. This summer will see Atlantan among the fleet on

Long Island Sound as she will journey northward in the early spring.

Atlantan, as mentioned, is 75 feet in length, with a beam of 14 feet. Her power plant consists of a pair of 6-cylinder model M Speedway motors which give her a cruising speed of 18 m.p.h.

Random Thoughts on Sailing

What It Takes to Make a Sailor, and the Burning Question of the Temperature In the Tropics—Hurricanes, Sharks, Mosquitoes and Other Incidentals

By Alfred F. Loomis

"THE blood of hundreds will be on your head if you make this cruise," said a friend of mine when I was discussing the possibilities of taking an auxiliary sailboat to the Pacific. That was a year ago, before the delightful little Hippocampus had sailed into my life.

"How's that?" I asked.

"Because you don't know anything about sailing, and you'll be fool enough to tell the readers of *MoToR BOATING* so, and the first thing you know, all others who are as ignorant as yourself will be following you to a watery grave."



A boat with divided sail and slender sticks is the ideal rig for Tropical cruising. Such a one is the auxiliary yawl Hippocampus

"But," I protested, "there doesn't seem to me to be anything difficult or dangerous in the plain, unvarnished sailing that I intend to do. I'll have a motor to get me out of the tight places."

"That's all very well," said my friend. "But it takes at least five years of experience to make a yachtsman. What do you know about scandalizing a mainsail, for instance?"

"Not a thing," I cheerfully admitted. "A mainsail is the last thing I'd want to scandalize—but if I were put to it, I bet it wouldn't take me five years to get the knack of it."

"You're hopeless," said my friend, and there the matter rested.

ADVICE ON YAWLS

Having learned that it was foolhardy of me to set off in a sailboat without prior experience in sailing, I next sought advice on the type of rig that is best suited for tropical cruising. The opinions delivered were many and varied.

One man who had a sloop to sell pointed out that Josh Slocum sailed around the world in a sloop, and I hadn't

the wit at the time to know that Captain Joshua, after one or two painful experiences, converted his sloop into a yawl and sailed for forty-two days on end without touching the wheel. Another man knew where I could get a bargain in a Long Island 30-footer, which had the advantage that in a sudden squall it would lie right over on its beam ends without capsizing. This bargain attracted me enormously until I was informed that cooking is difficult aboard a boat that's liable to lie over on its beam ends every minute or so.

Then I got into the hands of experts who assured me that a schooner is absolutely the only thing for long distance cruising.

"Very well," said I. "Bring on your schooners. Schooners for all hands."

It appeared that I had the wrong kind of schooner in mind. And when it penetrated my consciousness that a schooner yacht is a vessel with two whopping big mainsails, I lost some of my enthusiasm. This was to be a pleasure cruise—not a punishment.

Somebody—Bill Nutting, I think it was—suggested ketches. He knew where I could buy a fine big ketch

named Typhoon, that had sailed across the ocean and back. When he named a price of \$6,000 I contented myself with borrowing Typhoon's taffrail log.

Brigs, barks, brigantines, and barkentines being out of the question, my choice seemed to be narrowed down to yawls, and I paid a friendly call on Gerald T. White, editor of *The Rudder*, to ask him what he knew about yawls. He knew a lot about them.

"Theoretically," he said, "the yawl is the ideal type of sailboat for long or short distance cruising. Everybody who has never sailed a yawl will tell you that. However, I've yet to hear from a man who has sailed one, and my personal opinion is that actually a yawl is the worst rig for any kind of cruising. The mizzen mast is stepped above the waterline, and if that doesn't kill a yawl as a seaworthy proposition, I can give you a half dozen other objections that are just as valid."

"Well," I said, "I guess I won't take a cruise."

So I went out and bought the yawl Hippocampus, which is as seaworthy a packet as ever sailed the Spanish Main.

ADVICE ON MASTS

When Hippocampus was going into commission in New Rochelle last spring I learned the most discouraging things about her. In particular, her masts were too light for cruising in the southern seas.

"What you want," said a neighborly yacht owner, "are shorter, thicker masts that will stand the shock of a sudden squall. If I were you I'd take those spars out and replace them with sticks of at least two inches greater diameter. That six-inch mainmast is all right for protected cruising, but down where you're going it doesn't pay to take chances."

People talk about taking masts out of other people's boats as if they were lead pencils.

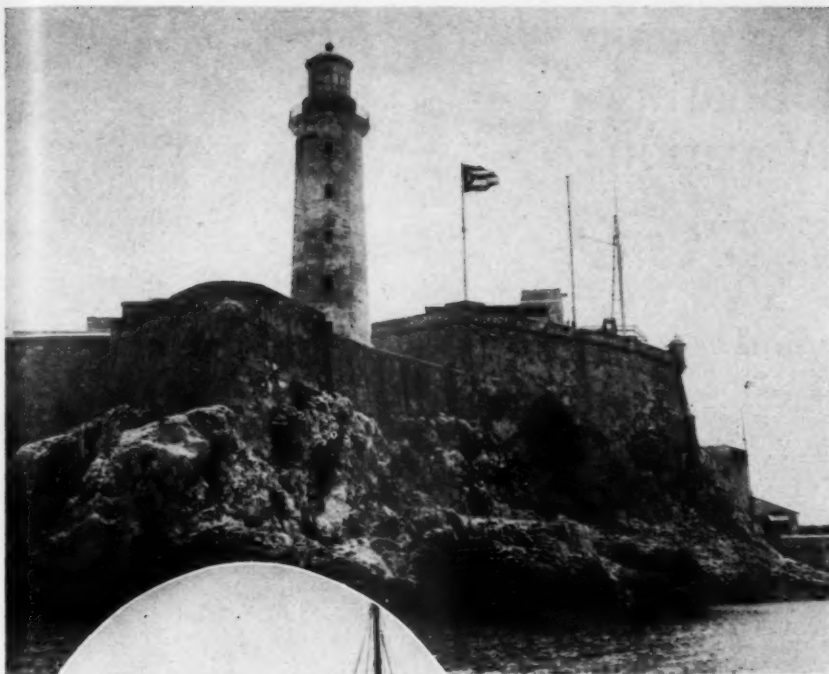


*One minute
Chambers and
Loomis were
trolling for sharks—*

So I held the advice in abeyance, not having the money nor the time to refit Hippocampus with heavier masts, and one morning about three months later it was returned vividly to my memory. We were lying in Kingston Harbor,



And the next minute the surface of the water was cut by dorsal fins. But they were only porpoises



Morro Castle and O'Donnell Light, Havana



Hippo stranded for cleaning her sides

Jamaica, and, at about ten o'clock, all hands were getting a last forty winks of beauty sleep when we heard sounds of a small boat being rowed in circles around Hippocampus. Presently a salty voice smote the calm morning air.

Said the voice, "Now here's a boat that must have been built especially for tropical cruising. Most yachts that come down here from the States have masts that are much too heavy. Hers are of exactly the right proportions."

"Good morning," I said, poking my head through the companionway. "How do you make that out? Up North they

told me that her sticks were entirely too light for this region."

"Not a bit of it," said the admirer of Hippocampus. "In the short, choppy seas we have down here, both in harbor and outside, the yachts with heavy spars shake themselves to pieces in no time. If you have light masts you can always reduce sail to save them. If your spars are heavy, you can never avoid that incessant pound, pound, pound that shakes the heart out of you and your yacht."

"Thanks," said I. "There's a certain savvy yacht owner up in New Rochelle who'd like to correspond with you."

MY HUMBLE OPINION OF YAWLS

My experience in sailing prior to the cruise of Hippocampus was confined to a short run in a sailing dory in Newport Harbor, and a seven-mile sail in a sloop in Bermuda. Consequently, I do not pose as an authority in sailing matters. However, it is my humble opinion that the yawl is the ideal type of rig for long distance work.

As compared with the schooner she has one heavy sail instead of two, and this is desirable when it becomes necessary to lower on the approach of a sharp squall. Moreover, a sea-going yawl can be built smaller than a schooner, which is a decided advantage when cost of operation and ease of handling are considerations. Between a sloop and a yawl there is no comparison, because the yawl has all the advantages of the sloop and has, in addition, the jigger sail which is her distinguishing characteristic. This jigger permits one to trim sheets so that the yawl practically steers herself.

(Continued on page 70)



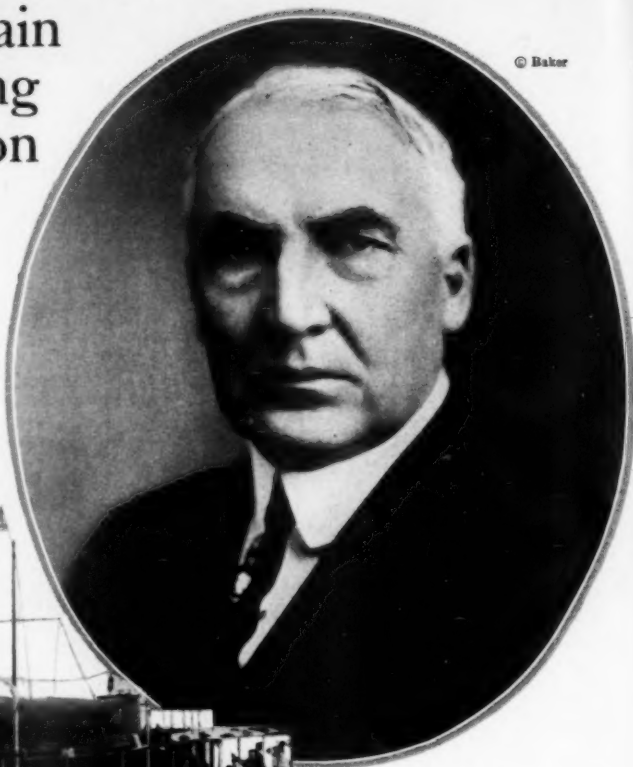
It's hot or cold in the Tropics according to the clothes you wear. Squibb, here is about medium

President Harding Again Chooses Motor Boating for His Annual Vacation

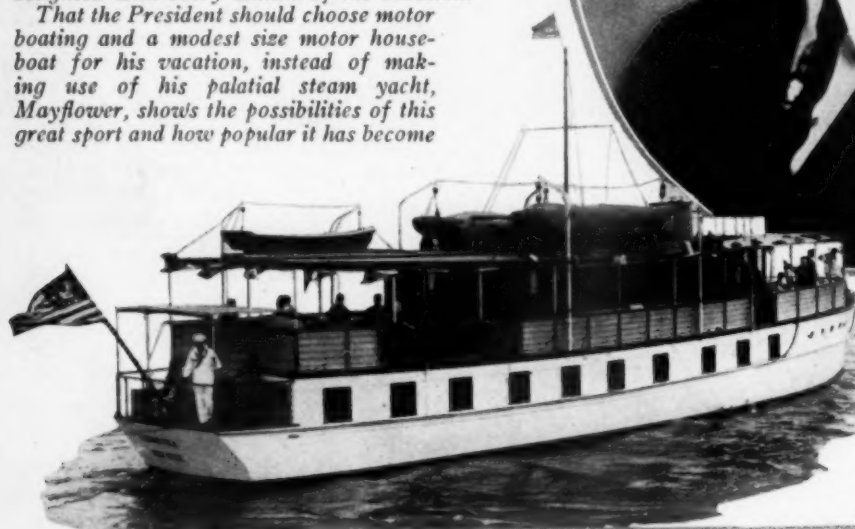
The Chief Executive and Mrs. Harding
Enjoy a Week's Cruise on a Motor
House Boat

THE cruising season is on. President Harding opened it in March with a cruise along the inland waterways of Florida, from St. Augustine to Palm Beach, a distance of 300 miles each way. The trip was made without accident or trouble of any kind and the President expressed himself as delighted with every minute of his vacation.

That the President should choose motor boating and a modest size motor house-boat for his vacation, instead of making use of his palatial steam yacht, Mayflower, shows the possibilities of this great sport and how popular it has become



© Baker



President Harding and two views of Nahmeoka, the motor house boat on which the presidential party cruised. Nahmeoka is powered with two 70-90 h.p. Standard motors

Photographs © by Underwood & Underwood, N. Y.



In Search of the Treasures of Treasure Island

The Further Adventures in Search of Buried Gold Ending as Usual in Disappointment and the Abandoning of the Quest

PART TWO

By R. V. Rothermel



Rothermel with his motion picture camera on the beach at Cocos Island

The opening chapter of this story deals with the organization of the expedition in search of a buried treasure and some of the early history concerning its origin. *Adventuress*, the schooner yacht used in making the journey, meets with storms and mishaps on the first leg of the voyage to the South Seas. Her experiences and the happenings en route to Cocos Island in the Pacific Ocean are related in detail with interesting side lights on the Panama Canal and cities stopped at during the trip. A violent storm causes much damage and breaks the main boom which is repaired at Coiba Island with the assistance of the prisoners detained there by the Panamanian government. The voyage is resumed and ends in the harbor of Chatham Bay, Cocos Island.



Mrs. Scabury and the pilot who took us through the canal. In the background can be seen one of the lock gates opening

It was a ghostly weird entrance we made in Cocos Island that night in the dark of the moon, and on the hillsides shrouded in mist my fancy painted gibbering ghosts of pirates who mocked at us for credulous fools. Certainly the pirates guarding their treasure were wiser than we seeking it.

For several days we rested up, replenished our supply of fresh water, wood, and coconuts and incidentally did a little unofficial exploring on the first uninhabited island that any of us, outside of the Captain, had ever set foot upon. The island is rocky and mountainous, rising sheer from the sea on all sides except for two small patches of sandy beach, one in Chatham, the other in Wafer Bay. Along the rocky shores are many beautiful waterfalls fed abundantly by the constant rains, and some of them, indeed, hurl themselves off the jagged cliffs clear into the sea.

The tropical vegetation is unbelievably thick and difficult of penetration, so much so that outside of running our picket lines to locate the burial spot of the treasure, we made no lengthy trips inland. It took the continued efforts of five of us, all swinging razor sharp machetes, to cut our way half a mile up the valley in a week's time.

Wild pigs are there in profusion, small, wiry, black animals that have crisscrossed the island with their trails and dotted it with their wallowing places. They are extremely wary of approach, but by waiting patiently at dawn or dusk at some likely muddy hole where we had previously scattered coconut meat, we managed to shoot one from time to time and so furnished ourselves with a welcome change of diet.

As we went back and forth from the yacht to the beach, myriads of birds hovered over our heads in fearless curi-

osity, some even daring to light on our heads and shoulders for an instant. There were pure white birds, white as the driven snow, flying always in pairs out over the water and for many miles out to sea. Ashore, the tiny little coal black canaries clung to the shade of the heavy foliage and trilled their song along with their more familiar brothers of orange and yellow plumage.

Fishing was simply beyond description, there being so many varieties that it seemed we seldom caught the same kind of fish twice. Big fellows and gamy, we usually caught them trolling from the skiff, towed behind the motor launch. For a little variation we hunted sharks with our rifles and a harpoon, but there were so many of them, and they were so easy to kill, there was not much zest in the game. One of them that was strung up on deck to be photographed furnished a shark steak that one of our expedition ate in solitary glory and said he found it most palatable.

For a week nothing was accomplished in locating the spot marked "X," as the weather continued so rainy and overcast that the Captain said it was impossible to get the observation of the sun necessary to correct our compass for precise work. This was essential, as the three corrugated iron shacks put up by Gissler, caused a marked deflection in the magnetic needle. These buildings were erected by a German who, alone with his wife, lived contentedly in the bight of Wafer Bay for over twenty years while he searched the island high and low for the treasure. His story ended tragically in the burning to death of his wife in a small blaze in their room in the hotel in New York where they were staying while he was trying to raise capital to exploit the island. Needless to say, he never



Adventuress at anchor off Balboa, Taboga Island in the right background

returned. We found his home probably just as he had left it and we were grateful for the shelter and convenience it provided us during our five weeks' stay on the island.

At last a compass correction was secured and, with high hopes, we started our picket lines through the heavy jungle. Our first bearing point was a rock on Cascara Island lying at the eastern point of Wafer Bay, while our second bearing was a tremendous old tree that must have been ancient when the gold was buried. Slowly and painfully we cut our way through the dense jungle, planting our pickets about every twenty-five feet as we went along. After we had all made the unwelcome acquaintance of millions of red ants that dropped from the giant ferns and creepers as we hacked our way along, we emerged on a clearing well up the side of the mountain and knew that we were way off the track. It was inconceivable that tons of gold would have been laboriously hauled up that steep grade when other more level ground was hard by.

We had spent a world of energy in running this line with meticulous care and, when we questioned McGrath about it, his explanation that he had run it for the purpose of throwing off the track any other expedition that might come there while we were at work merely confirmed our suspicions that all was not well in Denmark. As we ran six or seven other lines with equal labor, but less care, this suspicion was strengthened, till a careful analysis of our trip since leaving Panama proved beyond question that the Captain had consistently delayed



Capt. Wm. McGrath, the owner of the map and discoverer of more Cocos Islands than a houn' dawg has flees

the progress of the expedition and was doing so now in running the picket lines.

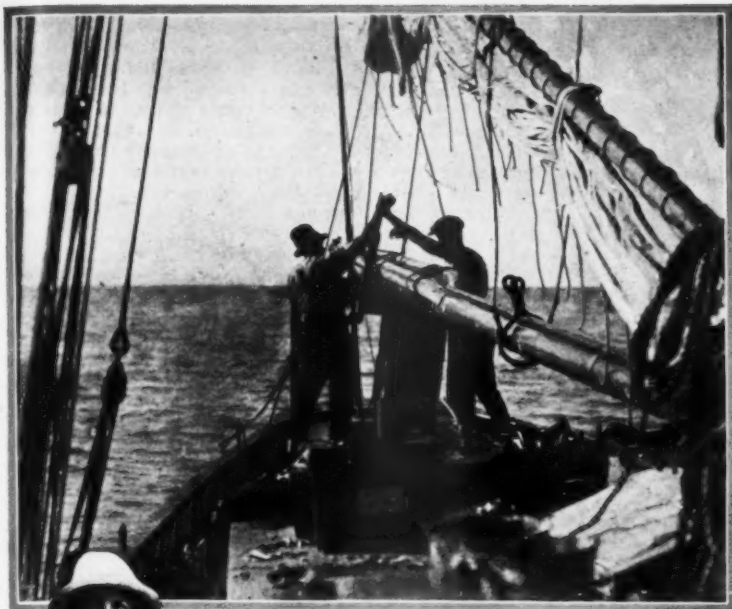
His purpose in this was clearly evident as he had a written agreement with Seabury, who owned the boat, that if for any reason the search at the island was unsuccessful and had to be given up, the boat would be sailed back to Panama and there sold. Out of the proceeds of the sale McGrath was to get two-thirds, although he had never put a cent of his own money into the purchase price. So it appeared reasonable to us that his aim was to stall in every possible way until such time as we would be forced to give up the search through lack of provisions. We would then have to return to Panama when all existing contracts and agreements would be automatically cancelled.

Color was lent to this view as a deep enmity had sprung up between the Captain and each member of the crew, and indeed it is my opinion that had it not been for the presence of Mrs. Seabury on board, a very serious situation would have developed. These suspicions of the Captain have since been proven true by a letter he wrote me after we parted company in Panama. Naturally, things could not go on in this fashion indefinitely and so one day, after Jack and Larry had voiced their opinions openly and had refused to follow McGrath a foot further, a council of war was held, and it was definitely decided that on the following Sunday we would up anchor and leave Cocos Island. This we had to do while we still had a chance to get back to Balboa with a bit of food left in the lazarette.

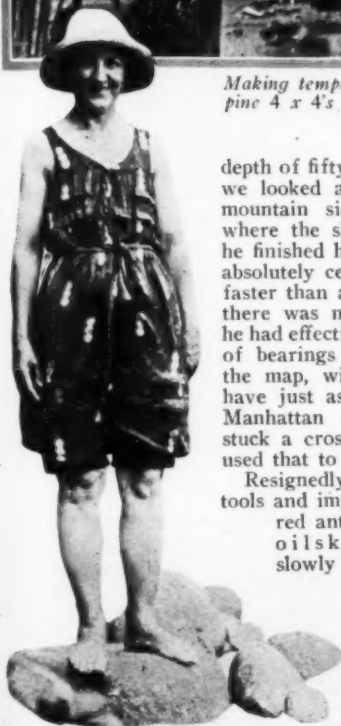
Thereupon our noble Captain agreed to this proposal and stated that the intersection of the last two stake lines actually marked the spot where the treasure was buried, but that there had been a tremendous side-slip from the mountain some twenty-five years ago and that this had crashed down into the valley, burying the forty-five millions under tons of rock and earth to a



Jack Nugent starting to work on one of the wild pigs we shot on the island



Making temporary repairs to the broken boom. Yellow pine 4 x 4's were wired about the splice to give added strength



Mrs. George Seabury, Mabel the cook, an all around good scout

depth of fifty feet or more. Wearily we looked around about us at the mountain side as he pointed out where the slip occurred, and when he finished his spiel, I, for one, was absolutely certain that he was lying faster than a horse could trot. But there was nothing we could do as he had effectively destroyed all traces of bearings and bearing points on the map, without which we might have just as well drawn a map of Manhattan Island from memory, stuck a cross on it somewhere and used that to go by.

Resignedly, we gathered up our tools and implements, shook the last

red ant from our oilskins and slowly made our way back to the beach. As we went we followed the picket lines and

pulled up the stakes that we had gone to so much back breaking la-

bor to plant so hopefully only a few days before.

For three days we made our preparations to sail. Wood for the galley stove was secured from the huge mahogany logs that strewed the beach, and these we sawed and split to stove length till we had sufficient fuel for another two months stowed away. Somebody had stood a heavy loss on this valuable cargo of mahogany washed up on the beach from the wreck of the steel freighter whose bones at low tide could be seen on the jagged rocks of Wafer Bay. With the wood aboard, we turned our attention to water and coconuts and, by Sunday evening, the 28th of August, we had everything snug and ready for sea.

As we hoisted sail and passed out beyond the headlands, we were treated to a wonderful sunset which, although the sun itself was hidden from view, was so beautiful that it seemed as if it must have been arranged for us by the pirate guardians of Cocos Island as a bit of consolation for the disappointment we had suffered at their hands.

But we had the further consolation of knowing that many and many an expedition before ours had been turned back unsuccessful in the quest. These were the names and dates we had seen cut deep into the boulders along the beach. Some of the inscriptions were made by the pirates themselves and others were made by the crews of French and British men-of-war scouring the seas in search of the Jolly Roger. His Majesty's steam frigate Sampson was there in 1824 and another frigate, Les Deux Amis, in 1797 carved her mark so deep that it is plainly legible today.

So it was we sailed away with a steady quartering wind and a following sea that brought us to anchor off Quarantine, Balboa, just six days later, to the hour. We had spent a month on the way out from Balboa to the island, and less than a week on the way back, but it might just as well have taken us six or eight weeks to make the return trip if we had had the misfortune to encounter the adverse winds and calms that the doldrums are noted for. It was just this possibility that led us to place two months' supply of wood and water aboard before we sailed from the island.

On our return to Balboa, considerable publicity was given to our expedition by the local newspapers, so that the sale of the boat was quickly accomplished to the intense relief of all of us and, no doubt, to the very real satisfaction of McGrath. He told me before I left the Zone that he intended to get up his own expedition to return to Cocos as soon as possible and, with that end in view, he secured as part of his share in the sale of *Adventuress* all the instruments, such as the compass, sextant, pelorus, and so on. I felt quite sure that if he did arrange for another trip out there it would have to be entirely on his own money, as I made no effort to refute the pretty general impression that had gotten abroad that McGrath had double-crossed us.



Rothermel and McGrath, peacefully seated on one of the huge mahogany logs on the shore at Wafer Bay



The engine room force of the oil burner, Santa Elisa, Rothermel at extreme left, seated

As a recompense for several quite disagreeable factors incident to the cruise of *Adventuress*, I promised myself a thoroughly pleasant trip back to the States irrespective of the fact that at this particular moment my financial condition was best described as broke. However, I took a real delight in the situation, finding myself on the beach in a strange country, not knowing a single solitary soul. As I spent my last nickel for a bag of peanuts, I couldn't help whistling for the very fun of the situation.

Before the sale of the boat was completed, I had divorced myself from the rest of the ex-treasure seekers, cashed an old ten-franc note I had carried with me ever since my return from France and, with the forty-five cents thus obtained, I blew myself to a couple of sodas, three bananas, and a bag of peanuts. The peanuts went last. In the meantime, I had met Britton, Dudek and Blessing, three Canal Zone bachelors, who seemed to think it quite natural and fitting that I should expect to receive anything and everything from them, up to and including the shirts on their backs. We ate yards of meals together at the commissary, on their tickets, we went on parties around town together, on their credit or cash, as the case might be, and, altogether, we had a corking good time. What a relief from four hours on and four hours off!

I had resolved that I would send no word to my folks at home, but rather would work my way up on some steamer. As business conditions on the Zone were terrible, I was not the only one on the beach, but, as usual, I had wonderful luck and landed a berth on one of the Grace Line steamers bound for New York. Having been engineer on the yacht, I naturally landed in the engine-room force of this oil burner and, in a few days' time, was regretfully saying good-bye to my new friends.

The trip up was wonderful, finer than

anything I had expected. There was a full moon when we were just half way to New York, so that every night of the seven days at sea was too glorious for words. The engine-room force on this line have the best of everything, equal in every respect to first class accommodation, and that in itself is saying a lot. I had an appetite like a Trojan, and actually enjoyed that run more than any other I have ever made at sea as a passenger—and I have made quite a few.

Back in New York again after six months of adventuring, I was really sorry to step ashore. I went direct to a telephone booth to phone my brother and informed him as casually as I could that I was back with a healthy appetite and a world of experience in lieu of the treasure. It was funny to hear him gasp with surprise at the other end of the phone. Then a prosaic ride home on the subway, an avalanche of questions and interrogations that lasted till the early hours of the morning, and my trip was over.

The sequel came a week or so later in the form of a letter from McGrath who remained at Panama. He admitted bluntly that he had not made any attempt to run the correct picket lines on the island, that he had had no intention of letting any of us dig in the right spot for what he must have considered his own particular treasure, and then, to cap the climax, he told me that he had been arrested on a charge of smuggling the instruments into Panama City from the American side. As a result of his arrest, all the money he had received from the sale of the boat went to those polite burglars down there to get him out of his predicament. I confess to being mortal enough to have had no sympathy for him, for I felt he had it coming to him. I wish him luck—he'll need it.

As a further sequel to this interesting cruise in search of buried treasure it might be mentioned that a new expedition is being organized to carry on the hunt. A recent newspaper item in a New York paper announced very briefly that negotiations were being entered into with the government of Costa Rica for permission to conduct a further search on Cocos Island for this treasure. It may well be that some day, someone will be successful. There has been so much seeking and so little available information as to where to look that it is problematical whether the buried treasure ever will be brought to light. Let us hope that the next party to engage in the search may have several surveyors among their number so that the deception of the captain which destroyed the chances of this party may not result in a similar destruction of hope.



One of the corrugated iron buildings put up by the German treasure-hunter Gistler at Wafer Bay

Simplicity in Motors

The Second of a New Series of Articles Which Will Explain the Operation of the Marine Motor—The Simplicity of the Two-Cycle Motor

By L. Huxtable



Fig. 17. The simple two-stroke-cycle engine, the circulation pump marked A, carburetor E and flywheel F

IN the previous article on the subject of gas engines we presented and named in pictorial form all of the principal parts of the engine which are common to both the two-stroke cycle and the four-stroke cycle types. In order to refresh our memory we will repeat these items and mention their names again. The various parts fully discussed in the previous article are cylinder, piston, piston rings, wrist pin, connecting rod, crankshaft, fly wheel, and crankcase. It would be well to refer to the previous issue in order to have a complete mental picture of these various parts, after which we are ready to pass on to a further study of the gas engine with a clear idea of its most essential parts. The differences between the two-stroke cycle and the four-stroke cycle motors was fully explained last month, and we illustrate here typical single-cylinder motors of the two types. The relative differences in construction are plainly apparent, and the lesser number of exposed working parts of the two-cycle machine is pronounced. The four-stroke engine shown in Fig. 18 shows plainly the timing gears C and D and other parts that are used for the operation of the valve, the functions of which will be more fully described in the chapter on the four-stroke cycle machine in the next issue. The parts in the diagrams are, the water circulating pump marked A, the lubricating cup B, and the carburetor E, and the flywheel F. These parts are essential to every engine, although in the two-cycle type the lubricator is often omitted.

The simplicity of the two-cycle motor permits of its being lubricated by oil introduced into the fuel and fed to the motor with the fuel. The standard proportions used are one pint of oil to each five gallons of gasoline. As this fuel is drawn into the crankcase compression chamber of the two-cycle motor and subsequently

reaches the combustion chamber, the oil carried in the mixture is deposited on all surfaces of the machine and effectively lubricates them. Much of the lubricating oil assembles in the crankcase after the motor has been operating for a short time, due to the evaporation of the gasoline, leaving the heavier oil behind. This is splashed about in the crankcase and further serves to lubricate all moving parts. This method of lubrication cannot be used on the four-cycle type of machine since the mixture does not reach the crankcase at any time during the cycle. It is necessary in these motors to provide other means of lubrication which is generally accomplished by means of oil cups and a splash system in which the oil is distributed directly from the oil sump.

By reason of the greater simplicity and the lesser number of working parts employed in the two-cycle, the manufacturing costs are much less, and the weight of the machine per unit of horsepower developed can be held down noticeably. The comparative illustrations in Figures 17 and 18 show completely assembled machines of the single-cylinder four-stroke cycle and of the two-stroke cycle types. It is apparent that the two-cycle engine is the simpler, owing to the absence of valve mechanisms which are not required in this type. The gas is admitted and expelled from the cylinders through ports or passages which are cored in the cylinder walls. These are so arranged that the piston covers and uncovers them during its travel at certain predetermined points. As they are opened and closed, the gas under pressure is blown in and out of the cylinder, performing work on the piston as the successive explosions take place.

The piston rings which are fitted on the piston, serve to make a gas-tight seal between the upper and lower portions of the cylinder. As the piston



Fig. 18. A typical four-stroke-cycle marine motor, parts lettered are circulation pump A, sight feed oiler B, timing gears C and D, carburetor E, and flywheel F

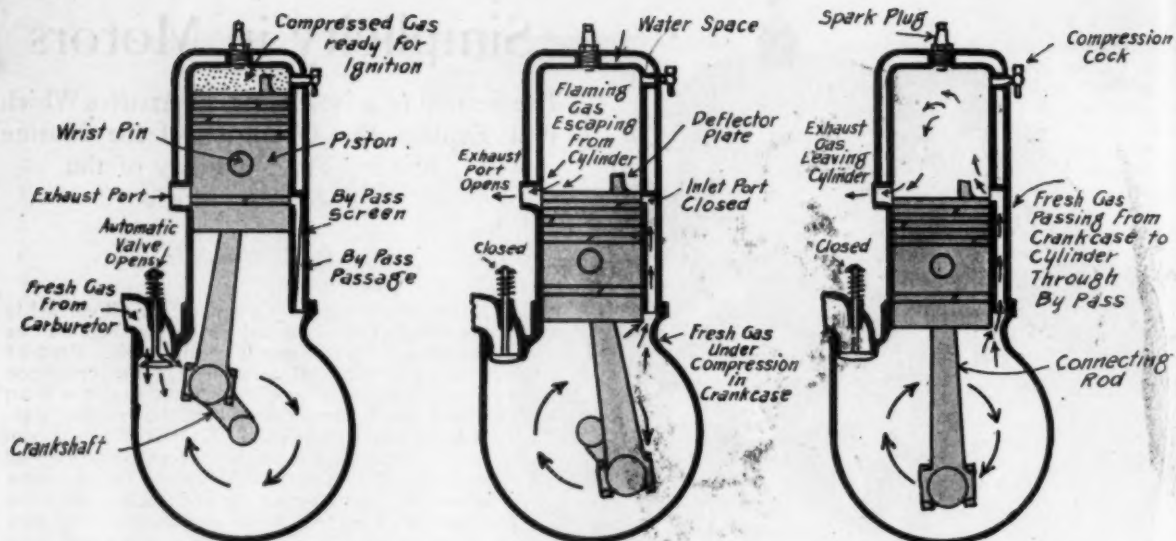


Fig. 19. The operating cycle of the two port two-cycle marine motor. Gas vapor enters the crankcase through the automatic valve and passes to the carburetor chamber through the passage, then leaves via the exhaust port as it is uncovered

moves upward in its travel within the cylinder, it creates a suction on its under side. This becomes great enough so that the atmospheric pressure on the outside rushes a volume of air in through the check valve, and carburetor filling the crankcase with an explosive mixture. Fig. 19 shows the piston just before it reaches the top of its stroke and the crankcase filled with the gas charge at atmospheric pressure. As this gas charge is being drawn into the crankcase the piston is travelling upward and is compressing into a small volume the previous charge which is now on the upper side of the piston. When the piston has reached the top of its travel, a spark takes place at the spark plug or ignitor points

which explode the compressed gas and drive the piston downward. When the piston starts its downward travel, the suction in the crankcase ceases and the check valve returns to its seat, helped by the action of its spring. As the piston moves downward, the gas in the crankcase is compressed slightly, and when the piston approaches the bottom of its stroke, it uncovers the exhaust port, Fig. 19B, which allows the burning exhaust gases to escape and reduces the pressure. At the very bottom of the stroke, the intake port, Fig. 19C, is

uncovered and the slightly compressed gas in the crankcase rushes up through the passage in the cylinder walls and

THE article which Mr. Huxtable has prepared for you this month describes the operating cycle of the two-stroke engine in detail. The next installment in the May number of *MoToR Boating* will cover the four-stroke engine in a similar way. Among the later articles which will appear in this same series, the differences between the modern marine engine and the aviation and automobile types will be emphasized so as to show why these latter types are unsuited for marine work. By reason of the fact that these articles will describe the gas engine from its foundation, they are particularly commended to the attention of the unskilled beginner in this sport.

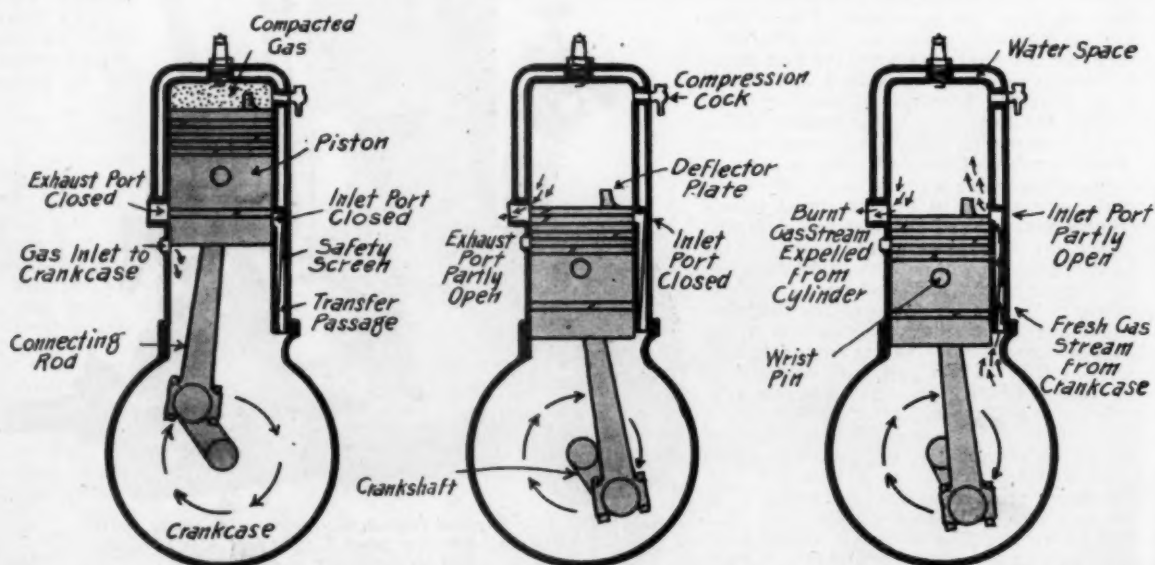


Fig. 20. The operation of the three port two-cycle marine motor. Gas vapor enters the lower crankcase only when the intake port is opened and is then transferred identically the same way as in the two port machine



Bowline Hitch

To Fasten One Rope to the Middle of Another, the End of Which Is Not Available

See page 31, February 1922, MoToR BOATING for the Bowline

Fig. 1. The formation of this is similar to making an ordinary bowline. Take a bight in your standing rope. Pass the end of the other through it

Fig. 2. Pass the end behind the standing part above the bight and down through it and haul tight. A strain may be taken on either part



Rolling Hitch

Used to Fasten a Rope to a Mast, Spar, Taut Rope or Chain, Where the Strain Is to Be Longitudinal

Fig. 1. Take a turn round your spar with the end under the hauling part. The end is in the right hand, with the sleeve turned up



Fig. 2. Pass the end round again over the first turn but still under the hauling part

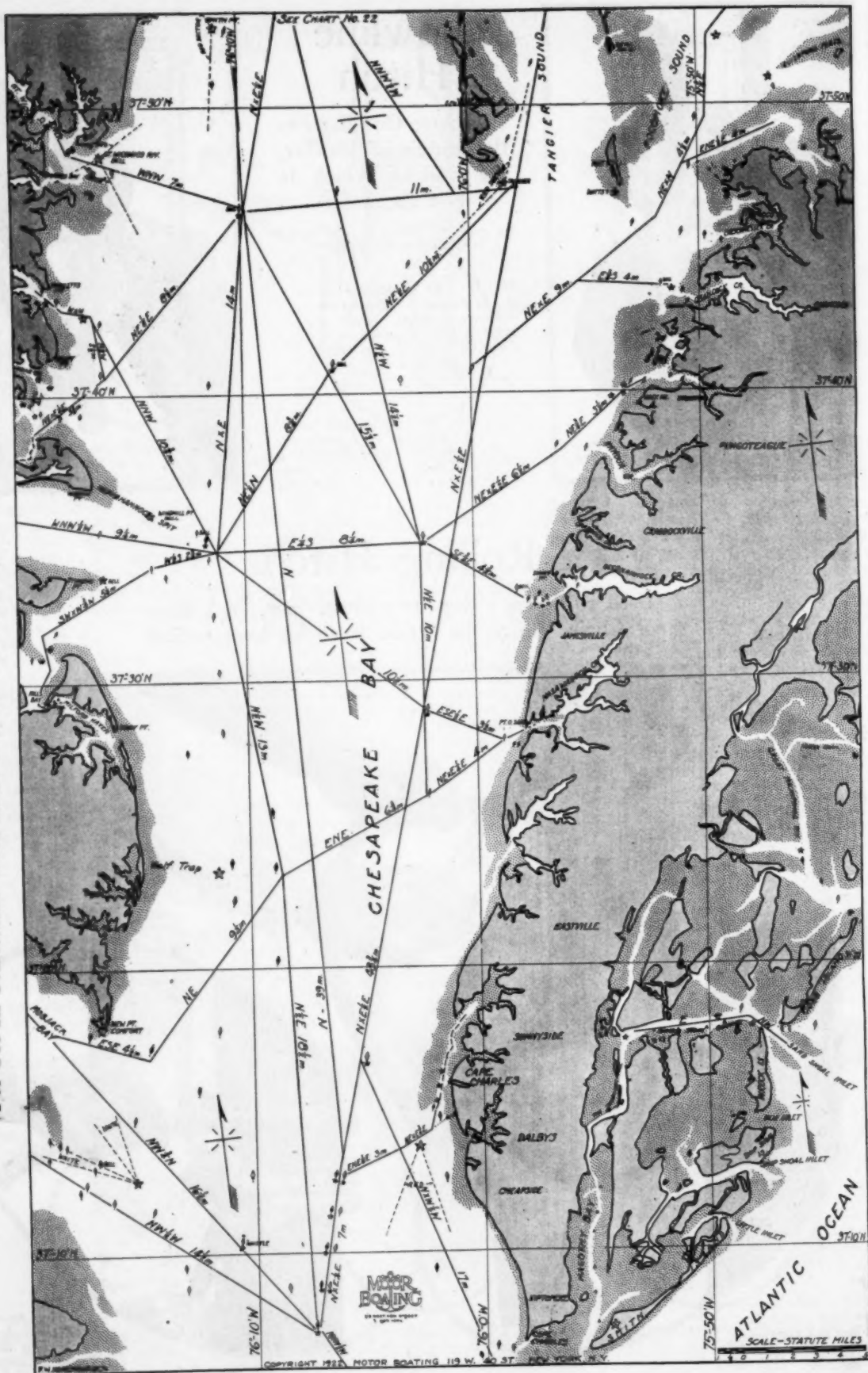


Fig. 3. Take another turn round the spar but this time over the other turns and the hauling part. Half-hitch

it by passing the end through its own turn. This hitch will not slip so long as the strain is parallel to spar

Motor Boatmen's Chart No. 30, Chesapeake Bay—Smith Point to Cape Charles

For Use In Connection With Coast and Geodetic Survey Charts Nos. 1221, 1222, 1223



Correspondence Course on Dead Reckoning Going Over Big

Large Number of Enrollments Are Received—
Questions on Lesson No. 1

THE second lesson in MoToR BOATING's new Correspondence Course will be found on pages 30-33 of this issue. The questions on the first lesson of the Dead Reckoning Course are printed on this page. The answers to these questions may be sent to us any time convenient. They will be submitted to the examiners on the last day of each month and the names of those who pass by at least 80% will be printed in the second issue of MoToR BOATING following.

The enthusiasm with which this new course has been received by our readers has exceeded all expectations. A large number of enrollments in the new course have already reached us and more are coming in by every mail.

The rules governing the new Correspondence Course are the same as those governing the course in Piloting, Seamanship and Small Boat Handling, which has just been concluded. Anyone, whether he is a subscriber of MoToR BOATING or not, may enroll by simply sending his name to the editor of MoToR BOATING, 119 West 40th Street, New York. A lesson in the Dead Reckoning Course will be printed in each of the next ten issues of MoToR BOATING. Questions on a particular lesson will be published in the issue following that issue in which the lesson itself is published. The questions will be practical ones in every sense, and there will be no attempt at catch questions of any nature. The answers to the questions may be sent to us any time convenient. After the publication of the last article or lesson, those who have submitted answers to each lesson and have received a mark of

80% or better, will be entitled to a suitable certificate signed by the examiners and the Editor of MoToR BOATING.

There will be no charge of any kind for an enrollment in the Correspondence Course, now or later.

In this issue of MoToR BOATING, on page 40, will be found the correct answers to the questions on Lesson No. 1 of the course in Piloting, Seamanship and Small Boat Handling. This lesson was on the Rules of the Road, Hints on Motor Boat Handling, and the Proper Whistle Signals to Blow. In the May issue of MoToR BOATING, we will publish the correct answers to lesson No. 2 of the first Correspondence Course, as well as a discussion of those questions which were generally most misunderstood.

In our June issue, lesson No. 3 will be reviewed, and the correct answers given to the questions on this lesson. In this way we hope to review the course in a manner which will be of the greatest benefit to our readers.

Although the first Correspondence Course is now concluded, yet enrollments are still open, and answers may be sent in to all lessons except lesson No. 1. After the correct

answers have been published on lesson No. 2, in our May number, no more answers on lesson No. 2 may be submitted, although answers to subsequent lessons will be accepted. Those who have failed in any of the lessons of the first Course, with the exception of lesson No. 1, still have the opportunity of trying again and submitting new answers to those lessons in which they failed to pass.

A large number of letters of approval have reached us from our readers. Most of these expressed in very high terms their approval of the first Correspondence Course. Many letters of commendation were also received on our plans for the new Correspondence Course on Dead Reckoning.

We give below paragraphs from a few of the letters which have recently reached us:

Dr. E. L. Yale, of Lansing, Mich., says: "A year ago I would not have thought of taking a boat and starting up the lake with it, without having some one along who had had some experience along that line. This year I shall not hesitate to start out; and that state of mind I owe very largely to you."

F. B. Smith, of Cleveland, Ohio, writes: "As this is the end of the Course, it seems like saying good-by to an old

friend whose company I have enjoyed very much. And now we will about face and say welcome to the course in 'Dead Reckoning,' by Dean Potter, who we all in the United States Power Squadron are proud of. Motor boatmen are certainly under great obligations to you for this course of lessons."

Dr. H. E. Watkins, of Muskegon, Mich., says: "To me, your course has been very pleasurable as well as profitable. I shall be almost sorry—yet there will be much satisfaction in it—when it is finished. We shall owe MoToR BOATING a debt of gratitude for the great work you will have done."

Fred H. Campbell, of Los Angeles, says: "I enjoy the course very much and think your magazine just fine."

QUESTIONS ON LESSON No. 1 MoToR Boating's Dead Reckoning Course

1. What is dead reckoning? *Dead reckoning is navigation by observation from one point of departure to another.*
2. During what weather conditions is dead reckoning employed? *Any or all.*
3. Define; great circle, meridians, longitude, difference of latitude, course, distance, departure.
4. How are longitude and latitude reckoned? *Longitude is reckoned in degrees, minutes and seconds. Latitude is reckoned in degrees and minutes.*
5. What is the latitude of a place? *Dead Reckoning is the latitude of New York City, 40° 42' N.*
6. How many degrees in the small circle represented by parallel 79° South Latitude? *360°*
7. Is the nautical mile along the parallel 79° South the same as on the equator? *Yes.*
8. Is a minute of longitude on the equator the same as a minute of latitude in Latitude 48° North? *Yes.*
9. Is there any difference between a minute of longitude and a minute of latitude? If so, what? *Yes. Longitude is a curved line, latitude is a straight line.*
10. How many nautical miles around the equator? *21,600*
11. How many nautical miles from the equator to New York? (Lat. 40° 42' N.) *2,642*
12. What is a rhumb line? Is it straight or curved? How does it cross successive meridians? *A rhumb line is a straight line. It crosses successive meridians at equal angles.*
13. Is the great circle track joining two places straight or curved? How does it cross successive meridians? Why? *A great circle track is a curved line. It crosses successive meridians at unequal angles.*
14. How is a vessel headed with respect to her port of destination (a) when on a rhumb course, (b) when on a great circle course? *(a) On a rhumb course, the vessel is headed in a straight line. (b) On a great circle course, the vessel is headed in a curved line.*
15. What is a knot? *A knot is a unit of speed, equal to one nautical mile per hour.*
16. How many feet in a nautical mile? *6,080 ft.*
17. What is meant by "taking departure"?

Note: Answers to the above questions should be mailed to the Editor of MoToR Boating, 119 West 40th Street, New York, N. Y.

The Mathematics of Navigation

The Application of Mathematics and Trigonometry to the Art of Dead Reckoning—The Second Lesson of a Correspondence Course Which Will Be a Complete Treatise on This Important Branch of Navigation

By Dean Potter

Chairman, Committee on Instruction, United States Power Squadrons, Inc.

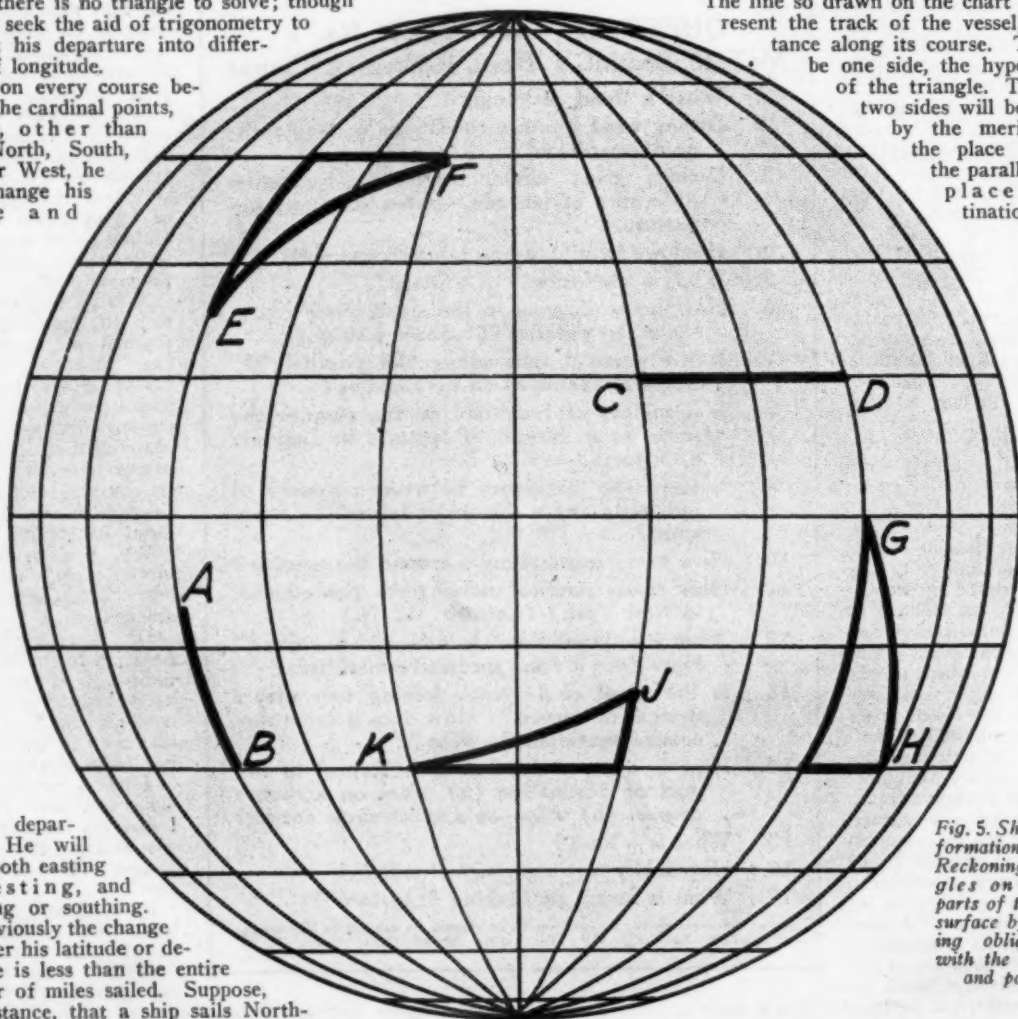
THE navigator sailing a true course of North or South, changes his latitude only. He is sailing along a meridian, and makes no departure. No trigonometric computation enters the case. For every mile of distance made good, his latitude changes one minute of arc.

If he sails true East or West, he makes departure, but does not change his latitude. He is sailing along a parallel. Again there is no triangle to solve; though he will seek the aid of trigonometry to convert his departure into difference of longitude.

But on every course between the cardinal points, that is, other than true North, South, East or West, he will change his latitude and

If a line be drawn on the chart obliquely, that is, neither North and South, nor East and West, but in any other direction, it will cross both a meridian and a parallel so as to form a right angled triangle. There is no possible way of drawing an oblique line on the chart which will not cross a meridian and a parallel, and thus form a triangle. This triangle we shall call the dead reckoning triangle.

The line so drawn on the chart will represent the track of the vessel, its distance along its course. This will be one side, the hypotenuse, of the triangle. The other two sides will be formed by the meridian of the place left and the parallel of the place of destination.



make departure. He will make both easting or westing, and northing or southing. Yet obviously the change in either his latitude or departure is less than the entire number of miles sailed. Suppose, for instance, that a ship sails North-east, distance 50 miles. She has not gone North 50 miles, nor has she gone East that amount. She has been cutting 'cross lots, making good a part of this distance to the North and a part to the East. But how much in each direction? This the navigator must determine so that he may know how much difference of latitude he has made good, and how much departure, and ultimately how much difference of longitude, and thus be able to refer to his chart and graphically locate his position by the aid of the co-ordinates (meridians and parallels) there shown. In the solution of this problem, trigonometry comes to his aid, as we shall now explain.

Fig. 5. Showing the formation of Dead Reckoning triangles on various parts of the earth's surface by combining oblique lines with the meridians and parallels

The triangle will always be a right-angled triangle, because the meridian and parallel forming two of its sides, invariably intersect each other at right angles.

The foregoing is illustrated by Fig. 5. AB represents a North or South sailing. The latitude changes, but there is no departure. CD is an East or West course. There is departure, but no change in the latitude. The lines EF, GH, and JK represent oblique courses, all crossing meridians and parallels, and forming triangles. If you fancy that you can draw an oblique course which will not triangulate, just try it!

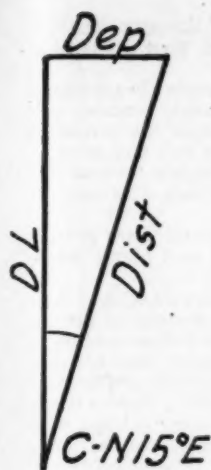
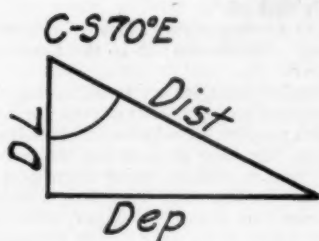


Fig. 6. Dead Reckoning triangles illustrating the naming of the sides



tional quirks come in when converting departure (miles) into difference of longitude (arc), yet the solution harks back to and is based upon the right triangle.

The dead reckoning triangle has certain invariable features:

1. It is always a right-angled triangle, for brevity called a right triangle.
2. The difference of latitude side is always along a meridian, running North or South, and the departure side along a parallel, running East and West.
3. The right angle is at the intersection of the meridian and parallel. The course angle is always the acute angle adjacent to the meridian, and is the one commonly involved in the solution of dead reckoning problems. The other acute angle is not solved.

Now every triangle has six parts, three sides and three angles; and trigonometry teaches us that if any three parts of a triangle are known, one being a side, the triangle may be solved, that is, all the other parts may be ascertained. The basic dead reckoning problem is merely the solution of this triangle.

The compass course, properly corrected, gives the navigator his true course; or the true angle between the ship's track and the meridian. This is one element of the triangle. His patent log or other devices give him the distance sailed on this course. This is another part of the triangle, always the hypotenuse, cutting a meridian and parallel. And he knows that the angle where the meridian and parallel intersect is a right angle. That is the third element. Thus he has a right-angled triangle, with one side and two angles known. He then solves the triangle, and learns the length of the other two sides, and thus has his difference of latitude and departure. He may then convert the departure into difference of longitude, if necessary.

In like manner, if he knows the departure and the difference of latitude between two places, he may solve the triangle and obtain the course and distance, from one to the other. In this case, he has two sides and an angle, the latter being the right angle where the departure and latitude sides intersect.

The common dead reckoning problem is nothing more than the solution, in one form or another, of the dead reckoning triangle above mentioned; and while a few addi-

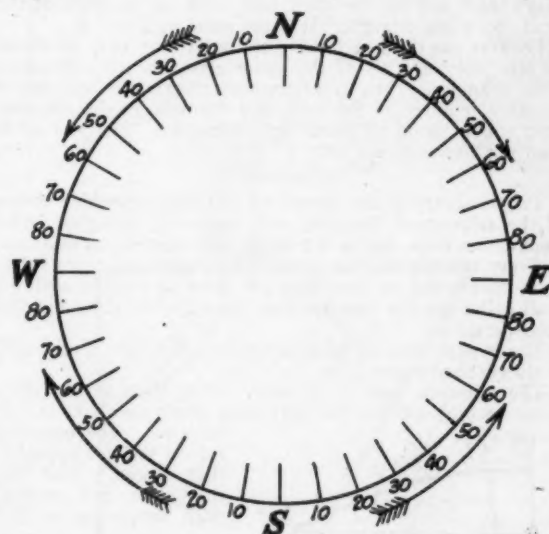


Fig. 7. The method of naming course angles in degrees from north and south towards east and west

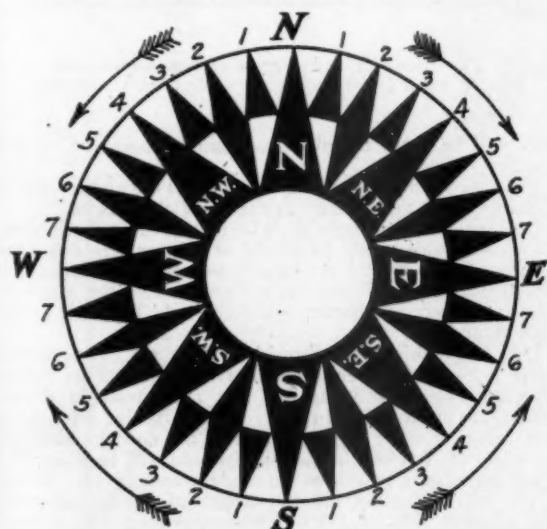


Fig. 8. The method of naming course angles in points from north and south towards east and west

The diagram, Fig. 6, illustrates a number of dead reckoning triangles.

It will be noted that in drawing the dead reckoning triangle, the Diff. of Lat. side is always perpendicular, because the meridians run North and South. The Dep. side is horizontal, as the parallels run East and West. The side representing the distance is the hypotenuse, always the longest side, and the side opposite the right angle.

The course is always the acute angle adjacent to the meridian (or Diff. of Lat. side), for the course is the angle which the ship's track makes with the meridian. The meridians invariably run North or South. Hence, the course angle is measured, whether in degrees or points, from North or South, around toward East or West. See Figs. 7 and 8. Thus, NE x E is a 5 point course; S x W a one point course; W 3/4 N a 7 1/4 point course. (See Bowditch, p. 16.)

The new navy compass is divided on the outer circle into degrees numbered from 0° at North, around clockwise, to 359°, with 90° at East, 180° at South, and 270° at West. But the navy style is merely another manner of naming the same angle. For instance, a course of 170° means the 10° angle measured between the South or 180° point and the 170° division, and this 10° angle is the angle between the

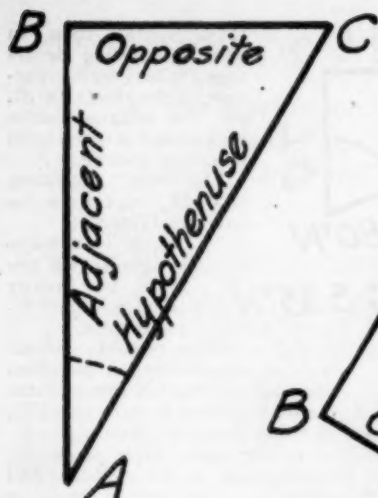


Fig. 9. The relation between the adjacent and opposite sides of a triangle

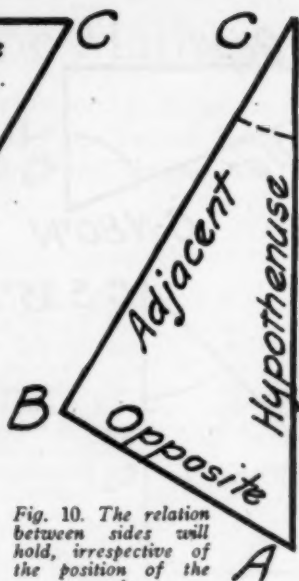


Fig. 10. The relation between sides will hold, irrespective of the position of the angle

ship's track and the meridian, and is the course angle of the dead reckoning triangle. It is the same as $S 10^\circ E$.

However the dead reckoning triangles may vary in shape or size, they are all of the same class, namely, all plane right triangles. Thus in solving the triangle, the only trigonometry required is the part, and fortunately the simplest part, which treats of plane right triangles. The rest of it need not now concern us.

TRIGONOMETRY

Trigonometry is the branch of mathematics which treats of the relation of the sides and angles of triangles. The word comes from *trigon*, a triangle, and *metrein*, to measure.

Every triangle has six parts, three angles and three sides. It is convenient to designate the sides by names, and we shall call them the hypotenuse, the adjacent side, and the opposite side.

The hypotenuse is the side opposite the right angle, and is always the longest side.

The adjacent side is the side (other than the hypotenuse) which adjoins the particular angle involved in the solution. The opposite

side is the one opposite that angle. That is, the sides are named with reference to the

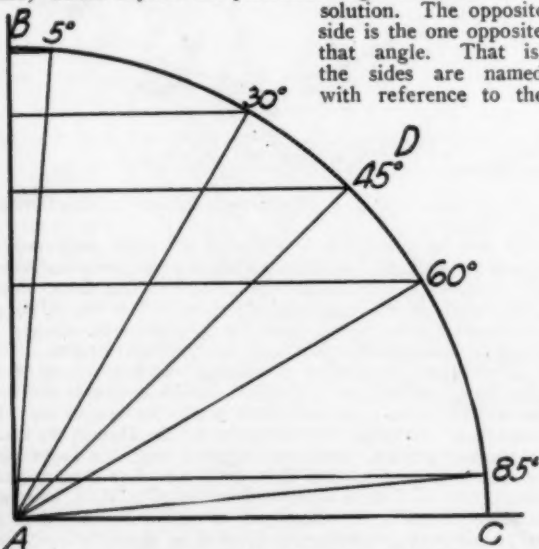


Fig. 12. The relation between the adjacent and opposite sides of a triangle changes with the angle

particular angle which happens to be employed in the problem; in dead reckoning, the course angle. Thus in Fig. 9, if the angle at A is the one worked from or the one to be

found, then AB is the adjacent and BC the opposite sides. In Fig. 10, if the angle at C is employed, then CB is adjacent and AB opposite.

The sum of all the angles of any triangle always equals two right angles, or 180° . The right angle contains 90° , and the remaining 90° are divided between the two acute angles. If one is 30° , the other must be 60° , and so on.

The complement of an angle is the difference between that angle and 90° ; the supplement is the difference between the angle and 180° .

The corresponding sides of similar triangles are proportional. Learn this; it is the heart and soul of the whole matter.

Similar triangles are those having the same angles at their respective corners. It matters not what the size of the triangles may be, or whether their sides are inches or miles in length. So long as each has the same angles, they are similar; and if similar, their corresponding sides are proportional. Perhaps one triangle is a small affair, such as might be drawn on a sheet of paper, while the other is huge, with sides many miles long. Yet if their angles are the same, they are similar, and their corresponding sides proportional. This means that a side of the little triangle, such as the hypotenuse, will have the same proportion or relation or ratio to the hypotenuse of the big one, as any of the other sides of the small triangle has to the same side of the large.

In the diagram, Fig. 11, let ABC represent any right triangle. If the hypotenuse be doubled, as by extending it from B to B', then the other sides AC' and C'B' will be twice the length of the corresponding sides of the first triangle. This same proportion would be preserved no matter how many times the hypotenuse be extended. The small interlined triangles, 2 and 3, afford graphic proof, for plainly they are of the same size as 1, and show that C'B' is twice, and C''B'' thrice CB. Likewise multiplying or dividing any side will cause a proportional multiplication or division of each other corresponding side, so long as the angle remains unchanged.

Take a triangle with an hypotenuse of 5, an adjacent side of 4 and an opposite side of 3 inches. If we enlarge the triangle so that the hypotenuse is 15 inches, then the adjacent and opposite

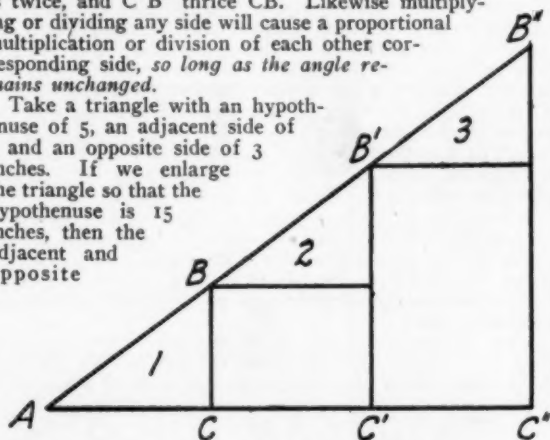


Fig. 11. The similarity and proportion between the side of a triangle are preserved while the angle remains constant

sides will be three times their original length, or 12 and 9 inches respectively.

The ratios remain unchanged so long as the angle remains unchanged, but they change as the angle changes.

Obviously, if the angle at A be increased or diminished, the opposite side would be longer or shorter, supposing the hypotenuse to remain the same. So also, as the angle is spread out, but with the same hypotenuse, the adjacent side would become shorter, while it would lengthen as the angle diminishes.

This is graphically illustrated by Fig. 12. The quarter circle is everywhere equi-distant from A. Let its radius represent the hypotenuse of any right triangle drawn within, having the upright AB for the adjacent side, and a line drawn at right angles thereto as the opposite side. If the angle at A is small, the opposite side will be short; but it will increase in length as the angle broadens out. At say 85° , it will be nearly the full length of the hypotenuse. The adjacent side, on the other hand, is long with a small angle, and decreases as the angle expands. At 5° it nearly equals the hypotenuse. At 85° its length is but little. At

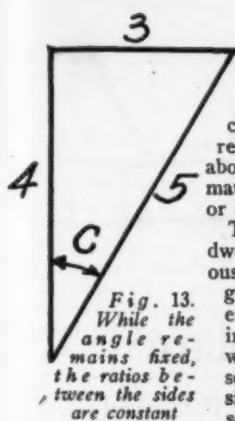


Fig. 13. While the angle remains fixed, the ratios between the sides are constant

it to scale on paper, and measuring its parts. If we drew accurately, the results of the paper triangle would apply to the real one, which might, for instance, contain a day's sailing, or a large stretch upon the land. Likewise, if we could discover the relationship between the different sides of a particular triangle, we could solve all other similar triangles by simple proportion.

The Functions. Any side of a right triangle stands in a certain proportion or ratio or relationship to each other side. Now a proportion may be expressed as a fraction. Suppose we drew a right triangle with an hypotenuse having a length of 5, an adjacent side of 4 and an opposite of 3, as in Fig. 13. Carefully measuring the angle at C, with a protractor, we would find it to be about $36^\circ 52'$. Now plainly, these sides stand in certain proportions, one to the other, which we may express as fractions. For instance, the opposite side stands in proportion to the hypotenuse

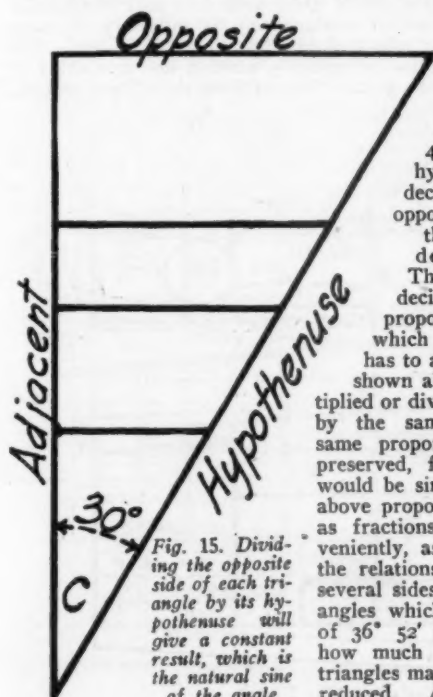


Fig. 15. Dividing the opposite side of each triangle by its hypotenuse will give a constant result, which is the natural sine of the angle

45° the opposite and adjacent sides are of equal length.

But it will be observed that while the adjacent and opposite sides increase or decrease as the angle changes, yet for any given angle, their relationship is fixed; and, as shown above, such relationship is constant no matter where the hypotenuse be, an inch or a thousand miles.

To some, it may seem that we have dwelt at tedious length upon a very obvious matter. But if the idea be firmly grasped, it will at once become apparent that all triangles are so interrelated that the rules which will solve one will solve all, irrespective of size. Thus we could solve any triangle by merely drawing

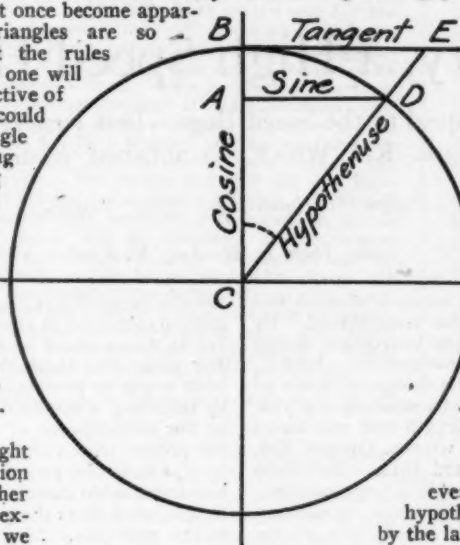


Fig. 14. The functions as lines

proportions, which are called *functions*, we could solve any triangle having an angle of $36^\circ 52'$ at C, for we have the ratios which "go with" that angle. If we extended the hypotenuse to 25, the opposite would still be .6 of the hypotenuse, or 15. If our adjacent was 120, the opposite would still be .75 of the adjacent, or 90; and so on.

Now the same plan applies to all right triangles, and affords the key to their solution. The proportions may always be expressed as fractions, in the manner above shown. And these fractional expressions may be converted into decimals by dividing the numerators (top numbers) by the denominators (bottom numbers), as we learned in the sixth grade. $3/5$ is the same as $3 \div 5$, or .6 (decimal).

The functions of the angles, when we get right down to it, are nothing but these decimals which express the ratios between various sides. The ratios for particular sides have names, such as sine, cosine, tangent, etc., by which they may be conveniently designated. When we said above that the ratio of the opposite to the hypotenuse of our little triangle, was $3/5$ or .6, we were really expressing the natural sine of the angle C, for .6 is the sine of $36^\circ 52'$. But we may always find the sine of any angle by dividing the opposite side by the hypotenuse. And since the rule is universal, we may say:

$$\text{sine } C = \frac{\text{opposite}}{\text{hypotenuse}}$$

If we took any right triangle whatever, measured the opposite side and hypotenuse, and then divided the former by the latter, we would obtain a decimal which

represents the sine of its angle at C.

Again, the ratio of the adjacent side to the hypotenuse, is called the cosine.

In the triangle drawn above, $4/5$ or .8 is the cosine of $36^\circ 52'$. The adjacent divided by the hypotenuse always gives the proportion between these two sides, and we may say:

$$\text{cosine } C = \frac{\text{adjacent}}{\text{hypotenuse}}$$

And, still again, $3/4$ ths, or .75 is the tangent, or relation between the opposite and adjacent side in the above case.

$$\text{tangent } C = \frac{\text{opposite}}{\text{adjacent}}$$

In any case whatever, we may measure any two sides and get their actual length, whether in inches, feet, yards, or miles, and divide the length of one side by that of another, as above, and obtain a decimal which will represent the proportion between those sides. This is a proportion which belongs to a particular angle at C, and to no other angle.

Now if we knew these proportions for all angles, and had them (Continued on page 98)

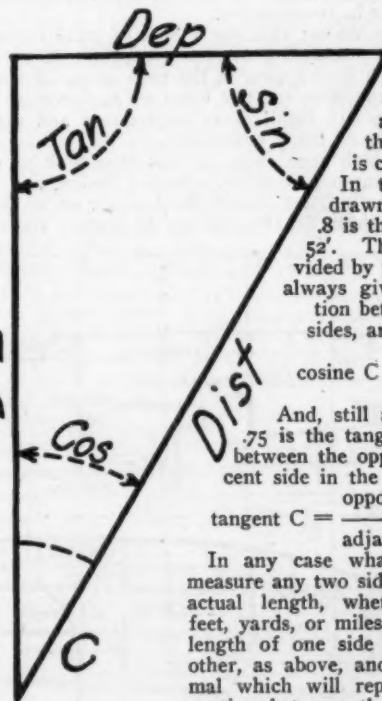
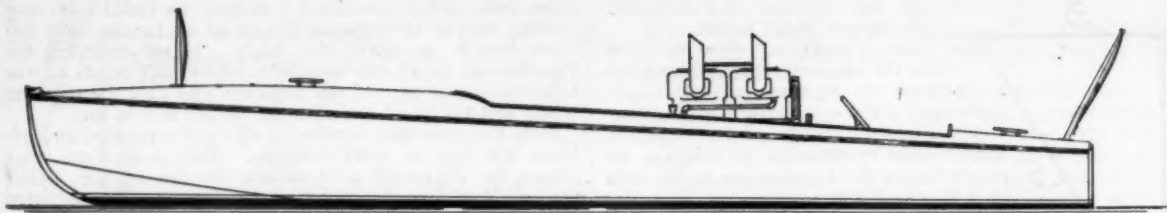


Fig. 16. Illustrating the functions to be used in solving the triangle in conjunction with various given sides



Miss Victory, a High Speed Hydroplane

A Design Which Will Appeal to the Speed Bugs—This Fast Hydroplane Is Patterned After the Famous Oregon Kid Which Established Many Records in Its Day

Designed Exclusively for Motor Boating

By John L. Hacker, N. A.

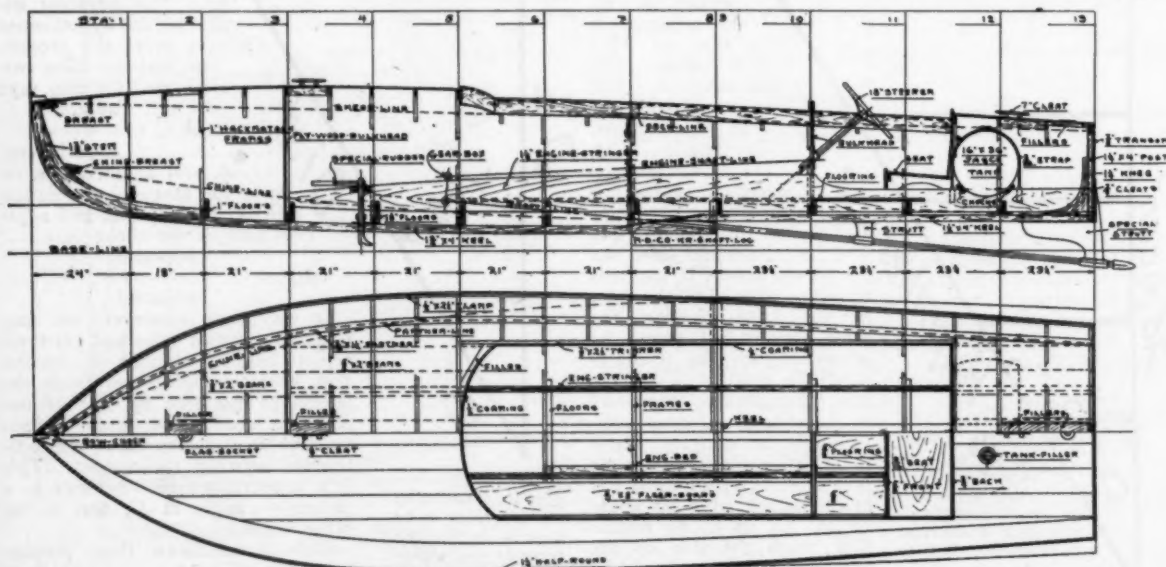
IN one of the earlier designs in this series a promise was made that the speed bug would be remembered. By way of keeping this promise, this first hydroplane design will more than satisfy the high speed enthusiasts. John L. Hacker, the acknowledged leader in the design of boats of this type, has prepared these drawings particularly for you. This boat has been made 22 feet in length and was based on the design of the famous western winner, Oregon Kid, which defeated all comers in 1913 and 1914. This little boat was only 20 feet in length and was, in a large measure, the forerunner of our present day hydroplanes. In increasing the length by two feet, the speed possibilities of the hull will not suffer and, in addition, its seaworthy ability will be noticeably increased. It will further cause it to act very much better in rough water.

For those who do not care for a boat of quite this size, Mr. Hacker has promised a smaller hydroplane of only 17 feet length which is to appear in the next issue. Knowing the designer's reputation for fast boats we can promise that this little design will fulfill every expectation and satisfy the speed longing of many enthusiasts.

Naturally, a high speed boat of this type will be very sensitive to alterations from the published design, and it is suggested that the builders consult the designer on all points involving the slightest departure from the plans. The most

suitable motor for this hull will be any standard light weight marine motor up to about 300 h.p. With a motor as powerful as this a speed of 60 miles per hour can be promised. For those who think this too fast, a speed of 45 miles an hour might be preferable. This can be obtained very easily by installing a standard motor of about 100 h.p. Inasmuch as the performance of the boat is largely dependent upon the proper trim and balance of the hull, the designer will be glad to advise prospective builders on these matters. Let him know what motor you plan to use, its power, size, and weight, as well as the reduction ratio which will take place in the gear box. Mr. Hacker will be glad to recommend the proper placing of the motor and also the most suitable propeller for the particular combination, so that the utmost efficiency will be secured from the outfit. He has further promised to render this service to our readers without obligation.

It will be noted from the drawings that much attention has been paid to the reduction in unnecessary weights. With high speed craft each pound counts, and the builder of a boat of this nature must keep this fact continually before him. Careful workmanship is necessary, as thin planks are easily split and thin frames easily broken. The light materials must be carefully handled and assembled in order to secure the greatest benefit from their lesser weight.



Blue prints of the drawings for this boat, to a scale of one inch to the foot, can be had at moderate cost by addressing F. W. Horenburger, 63 West 184th Street, New York, N. Y.

Several builders and manufacturers are planning to furnish fittings and material for the several boats which have been designed in this series by Mr. Hacker. The editor will be glad to furnish prospective builders with this information. Many fittings are standardized and can be furnished at a cost which will be less than required to make patterns for individual parts.

In constructing a boat of this nature and size, it is always the best policy to lay down the lines in full size. The offset table, which gives the complete dimensions for every part of the hull, accompanies the drawings. All dimensions are given in feet, inches, eighths, and halves or sixteenths. For example, an offset reading, 0-3-6 would mean 0 feet, 3 inches, and 6/8 inches or 3/4 inches. Another way of writing this would simply be 3 3/4 inches. Another example, 1-2-4, would mean, 1 foot, 2 1/2 inches. This system of numbering offset dimensions is standardized, and is followed universally by all naval architects.

The lay-out should be made on paper at least 4 feet wide and sufficiently long. All water lines are drawn in with the same center line, after which the keel, chine, and sheer lines are spotted on the paper. The heights can then be marked off, transferring them from the floor plan by means of a small batten. These points are then crossed by the chine and sheer widths each at the proper station, after which a fair line is drawn through the various points. The buttock and water lines are then spotted on the paper and, when all are drawn in, draw a line to represent the thickness of the planking. This will be 7/16 inches on the sides and 9/16 inches on the bottom. Mark off the keel and chine sizes, after which you will be ready to make the frames. To do this, lift the paper on one side, place a hackmatack knee underneath and prick through on the frame line. Now draw a pencil line through the points and tack two similar pieces together. Both are sawed out at the same operation and used one for each side of the boat. This boat is best built with the keel down. It is kept in this position until the sides are planked to the chine. It can then be turned over and the bottom planked. After the bottom is finished, dress and sand-paper the entire job, apply the hot oil as specified, and fill all seams before turning the boat over again. The inside of the hull should next

be oiled, followed by the lead paint up to the chine line. These operations will save much time if performed as outlined.

Complete structural specifications for building this 22-foot hydroplane follow:

General Specifications

Keel: Forward keel to be of white oak or yellow pine 1 3/4 by 4 inches. It is to be properly beveled and rabbeted.

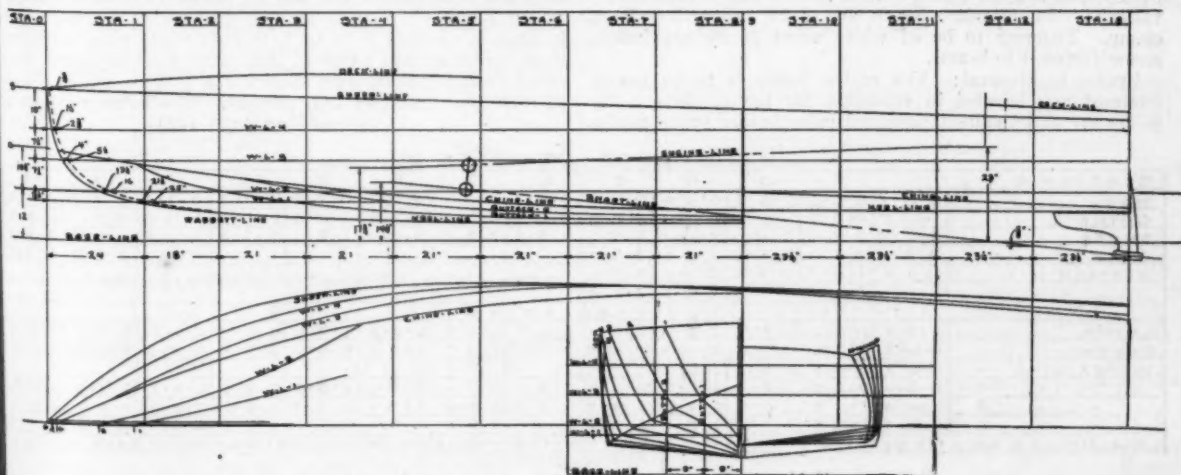
The after keel of the same material is to be 1 3/4 by 4 inches. This is to be similarly beveled and rabbeted up to the step. Keels are to be joined at step, having a filler in between. Canvas duck and heavy paint are to be applied on each side of the filler. To be through fastened into rabbet with 3/4-inch brass bolts through a Mechanical Devices Co. KR metal shaft log, applying same on canvas and heavy paint. Bevel properly and bore hole to take 1 1/2-inch shaft.

Stem: The stem is to be shaped from a 1 3/8-inch Hackmatack knee. It is to be properly beveled and rabbeted to suit planking and through bolted to keel with three 3/4-inch bolts. Then complete the rabbeting to the keel.

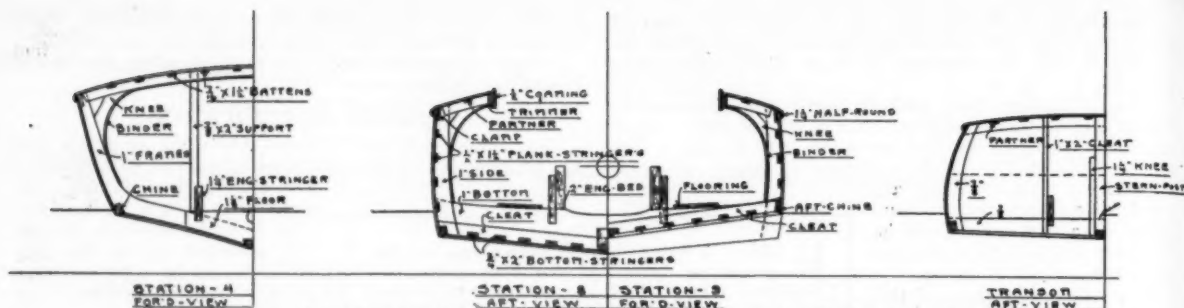
Transom: Transom is to be of 3/8-inch mahogany in a single width. If necessary to use two pieces, cleat in the center to take the seam. It is to have a 1 1/4-by 4-inch oak post in the center, and to be fastened to keel with a 1 1/4-inch Hackmatack knee on each side. To have a 3/8-inch cleat on sides, bottom, and top. To be screw fastened through-out and all holes wood plugged.

Step: To have a 1-inch bottom member, shaped as per detail which is to extend from side to side. Further, to have two side members to be halved on the forward side and securely riveted with a good coat of paint between. When completed, cut an opening the size of after keel and slide in place and fasten to keel with through bolts into rabbet. Fasten a 3/8-inch cleat on forward side flush with the bottom edge. Then fasten another cleat on the after side to form step section. Apply light canvas duck on heavy paint and securely rivet and screw fasten.

Frames: All frames to be shaped from Hackmatack knees 1 inch thick. They are to have two members to extend from keel to sheer and to be tied with an oak or ash floor 1 1/2 inches thick as per detail. Frames to be through bolted to rabbet with 3/4-inch bolts. If Hackmatack knees are not procurable, frames will consist of a bottom and side member halving the side into the bottom, and to be then fastened with a floor in a like manner. All bottom members may be



Complete set of lines in profile and section for Miss Victory.



Structural details of typical station points, for Miss Victory, the Hacker hydroplane

in single piece from chine to chine aft of station 4, in which case they should be 1 inch in thickness.

Chines: Forward chine to be shaped from oak or yellow pine $1\frac{1}{2}$ by 2 inches. It is to be in a single piece, properly beveled and rabbeted and slightly tapered toward the stem. It is to be screw fastened to the stem and reinforced with an oak breast hook. To be through riveted with $5/16$ -inch copper rod to frames and screw fastened and reinforced on each side with a knee at the step. The after chine of similar material to be $1\frac{1}{2}$ by 2 inches and to extend to station 7. It is to be properly beveled and rabbeted and to be fastened to frames in a like manner to forward chines, and to have a knee on each side to the transom. The after chines may be screw fastened.

Engine Stringers: To be of $1\frac{1}{4}$ -inch selected spruce and to be shaped as indicated on plan, notched over frame floors and through bolted to floors with $3/8$ -inch galvanized bolts. It is to extend to the stern and fasten to a cleat on the transom.

Engine Bed: To be of 2-inch oak or ash and aligned to suit motor to be installed. Through bolted to stringer every 9 inches with $5/16$ -inch bolts. Bottom edge to rest on floors.

Plank-Stringers and Clamp: Clamp to be of white oak $3/8$ by $2\frac{1}{2}$ inches, notched into frames and securely screw fastened. Side stringers to be of $1/2$ -inch by $1\frac{1}{2}$ -inch oak or yellow pine and also notched into frames and screw fastened. Bottom stringers on forward plane to be $3/4$ -by-2-inch oak or yellow pine. This is to be spaced approximately as indicated on plan and to have two fastenings through each stringer on each frame, using one $1/4$ -inch carriage bolt and one galvanized screw and to be screw fastened to the stem. Stringers for the after plane to be $3/8$ by $1\frac{1}{4}$ inches and to be fastened in a similar manner. The bolt fastening may be omitted and two screws used in its place.

Deck-Beams and Trimmer: Deck beams to be of clear white wood $3/8$ by 2 inches on the frames and $5/8$ by 2 inches in between. Beams on main frames to be let into frames and to have a knee of the same thickness to support the deck which is to be bound with a $3/8$ -inch oak binder, screw fastened. Intermediate beams are to be fastened through clamp. Trimmer to be of white wood $3/8$ by $2\frac{1}{2}$ inches screw fastened to beams.

Frame in General: The entire frame is to be neatly trimmed and beveled in readiness for the planking. All joints are to be painted with red paint before being finally

made up, and all parts are to be painted or oiled as the planking is applied.

Planking: Sides to be planked with a single thickness of $7/16$ -inch mahogany or cedar. It is to be spiled approximately as indicated on the plan. It is to be screw fastened to frames with $1\frac{1}{4}$ -inch No. 9 galvanized or brass screws, as well as to stem and stern. It is to be copper riveted to stringers every 3 inches, copper clout nails may be used if desired. All butts are to be made on oak butt-blocks. These blocks are to be at least 8 inches long and to have eight fastenings on each side. Planking to be screw fastened into chines and clamp with 1-inch No. 8 screws. Holes to be counter-bored and wood plugged. Bottom planking will be double and consist of an inner plank of $3/16$ inch and a fore and aft plank of $3/8$ inch. Inner plank to be laid diagonally and complete fastenings made through outside plank. The diagonal planking should be applied and temporarily fastened, after which 36 -inch AA canvas drill is to be applied. A coat of heavy marine glue is applied, covering just such portions as the plank will cover as the work progresses. Marine glue made by Aero Marine Laboratories, North Tonawanda, New York, is recommended. Planking is to be screw fastened with the frames the same as the sides and copper riveted through stringers. Screw fasten into the chines, keel, stem, and step. Use single length planking. The fourth, fifth, and sixth plank may be begun on chine. The after planking to be of a single thickness, $1/2$ inch, and fastened in a like manner as on the forward plane. The planking at step is to be bound with a brass angle, inlaid into the bottom planking. This is to be laid in marine glue and securely screw fastened. All holes to be counterbored and wood plugged, using white shellac for a binder.

Decking: Beams to be neatly faired and trimmed. A $7/16$ -by- $1\frac{1}{2}$ -inch partner is to be inserted, notched into the beams and screw fastened. There are to be $7/16$ -by- $1\frac{1}{2}$ -inch battens, spaced approximately as per plan to take the deck seams. These will also be notched into the beams and screw fastened. Insert a 1-inch filler, shaped to take forward coaming. Deck is to have a $5/16$ -inch mahogany covering board to meet center of partner. Also to have a center plank of $1/2$ -inch mahogany let into beams. The balance of decking is to be $5/16$ -inch white pine, seams to meet center of the battens. All decking to be screw fastened flush to beams with $7/8$ -inch No. 7 brass screws. Use $3/4$ -inch No. 7 screws into partner. The balance of deck

(Continued on page 112)

| TABLE OF OFFSETS | | | | | | | | | | | | | | |
|---|--------|--------|--------|--------|--------|----------------------------------|-------|-------|-------|--------|--------|-------|-------|-------|
| STATION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| KEEL | 0-8-7 | 0-5-6 | 0-5-5 | 0-4-6 | 0-4-3 | 0-4-1 | 0-4-1 | 0-4-1 | 0-7-3 | 0-7-3 | 0-7-3 | 0-7-3 | 0-7-3 | 0-7-3 |
| CHINE | 1-6-3 | 1-3-7 | 1-1-3 | 0-11-1 | 0-9-3 | 0-8-3 | 0-7-4 | 0-7-3 | 1-0-0 | 0-11-0 | 0-10-0 | 0-9-1 | 0-8-3 | 0-7-3 |
| SHEER | 3-0-1 | 2-0-5 | 2-11-0 | 2-10-4 | 2-9-7 | 2-9-2 | 2-8-5 | 2-8-0 | 2-8-0 | 2-7-3 | 2-6-5 | 2-6-0 | 2-5-1 | 2-4-3 |
| DECK | 3-3-1 | 3-4-1 | 3-4-4 | 3-4-3 | 3-3-7 | | | | | | | | | |
| BUTTOCK - 1 | 1-5-4 | 1-0-1 | 0-9-0 | 0-7-0 | 0-5-6 | STRAIGHT LINE FROM KEEL TO CHINE | | | | | | | | |
| " - 2 | | | 1-0-3 | 0-9-3 | 0-7-4 | | | | | | | | | |
| HALF-BREADTHS | | | | | | | | | | | | | | |
| CHINE | 0-9-5 | 1-4-1 | 1-9-7 | 2-2-1 | 2-5-1 | 2-6-7 | 2-7-7 | 2-8-3 | 2-9-2 | 2-8-4 | 2-7-7 | 2-7-3 | 2-6-0 | 2-4-4 |
| SHEER | 1-6-5 | 2-2-6 | 2-7-6 | 2-10-0 | 2-10-5 | 2-10-4 | 2-9-7 | 2-9-6 | 2-9-6 | 2-7-4 | 2-5-6 | 2-4-2 | 2-2-4 | 2-0-4 |
| WATER-LINE - 1 | 0-0-7 | 0-4-5 | 0-9-7 | 1-6-4 | | | | | | | | | | |
| " - 2 | 0-3-1 | 0-8-3 | 1-5-3 | 2-2-7 | 2-6-1 | 2-8-1 | 2-9-0 | 2-9-0 | 2-9-0 | 2-8-6 | 2-8-2 | 2-7-6 | 2-6-6 | 2-5-6 |
| " - 3 | 0-10-2 | 1-6-3 | 2-1-3 | 2-6-0 | 2-8-3 | 2-9-4 | 2-9-6 | 2-9-4 | 2-9-4 | 2-8-6 | 2-8-0 | 2-7-2 | 2-6-1 | 2-5-1 |
| " - 4 | 1-2-4 | 1-10-4 | 2-4-5 | 2-8-1 | 2-9-5 | 2-10-1 | 2-9-7 | 2-9-1 | 2-9-1 | 2-8-1 | 2-6-7 | 2-5-2 | 2-3-8 | 2-2-4 |
| ALL DIMENSIONS TO OUTSIDE OF PLANKING GIVEN IN FEET-INCHES-EIGHTS AND HALVES FROM BASE LINE | | | | | | | | | | | | | | |

Table of offsets for Miss Victory, at every station point

SMALL MOTOR BOATS

Their Care, Construction, and Equipment

A Monthly Prize Contest Conducted by Motor Boatmen

Questions Submitted for the June Prize Contest

1. Describe a method for accurately relocating or raising the waterline while the boat is hauled out on the beach or ways.

(Suggested by H. H. P., Oakland, Cal.)

2. What is the best and easiest way to thoroughly clean an oily bilge before putting the boat into commission?

(Suggested by C. H. C., Saginaw, Mich.)

Rules for the Prize Contest

ANSWERS to the above questions for the June issue, addressed to the editor of MoToR Boating, 119 West 40th St., New York, must be (a) in our hands on or before April 25, (b) about 500 words long, (c) written on one side of the paper only, (d) accompanied by the senders' names and addresses.

The name will be withheld and initials used. QUESTIONS for the next contest must reach us on or before April 25. The Editor reserves the right to make such changes and suggestions in the accepted answers as he may deem necessary.

The prizes are: For each of the best answers to the questions below, any article or articles sold by an advertiser advertising in the current issue of MoToR Boating of which the advertised price does not exceed \$25, or a credit of \$25 on any article which sells for more

than that amount. There are two prizes—one for each question—but a contestant need send in an answer to only one if he does not care to answer all.

For answers we print that do not win a prize we pay space rates.

For each of the questions selected for use in the following month's contest, any article or articles sold by an advertiser advertising in this issue of MoToR Boating of which the advertised price does not exceed \$5, or a credit of \$5 on any article which sells for more than that amount.

All details connected with the ordering of the prizes selected by the winners must be handled by us. The winners should be particular to specify from which advertisers they desire to have their prizes ordered.

Advantages of Running Motors at Higher Temperatures

The General Tendency to Operate at Temperatures Far Below the Most Efficient Can Be Remedied If Suggestions Made Here Are Followed

Answer to the Following Question Published in February Issue

"Describe a device for diminishing the supply of cooling water through the cylinder jacket, without putting any additional strain upon the pump, for the purpose of increasing the engine efficiency."

Increasing the Motor Temperature

(The Prize-Winning Answer)

IT is an acknowledged fact that all internal combustion engines become more efficient as the operating temperature is increased, but the maximum allowable temperature is limited by such practical considerations as the ability of the lubricating oil to successfully accomplish its purpose at high temperature, and, in water-cooled models, by the boiling point of the cooling medium. A copy of a test chart below shows how the fuel consumption decreases with rising temperature.

Most motor boat engines, however, force the water through the jackets too rapidly, and thereby keep the temperature down at an inefficient point, and in order to increase the efficiency and save on fuel, some means must be provided of regulating the amount of water passing through the jackets, thereby controlling the temperature.

The simplest method of accomplishing this without putting any additional strain on the pump is by diverting a portion of the cooling supply as shown in the diagram.

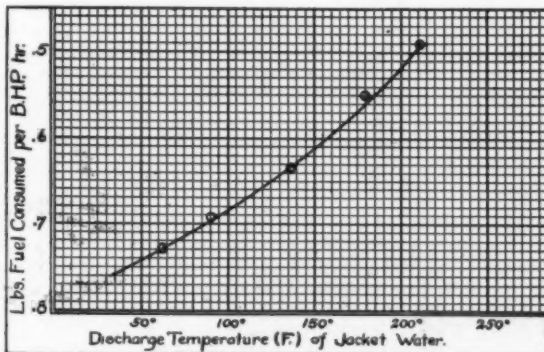
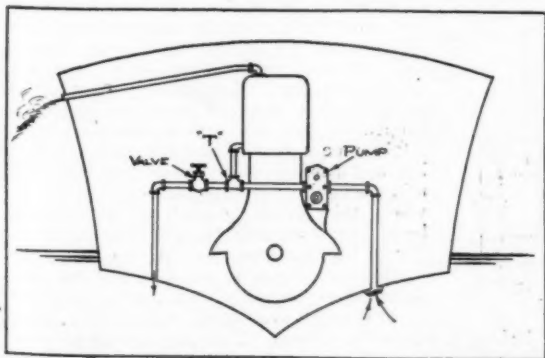
A T coupling is inserted in the line running from the circulating pump to the water jacket and a pipe led from here overboard. The outlet of this line must be lower than the pump and preferably under water, while a valve is

placed at the most convenient point in the line. The diagram is self explanatory.

The action is as follows: Starting up the motor with the valve closed fills the water jacket and establishes circulation, after which the valve is slowly opened, allowing a portion of the water to take the path of least resistance and flow overboard without passing through the water jacket of the motor, thereby reducing the amount capable of cooling the motor. The valve should be opened until the discharge from the motor is but a slow stream of steaming water. If the outlet from the motor is above the water line and so situated as to be easily watched, the process of regulating the valve is simplified considerably, otherwise a Motometer should be installed in the discharge line, or the pipe felt with the hand occasionally to determine whether sufficient water is passing through the engine to prevent overheating. By closing the valve completely the entire supply of water is passed through the cylinder jacket or, if the regular outlet is above water, leaving the valve open after the engine stops, will drain the jacket.

This system is about the most inexpensive possible and, in the hands of an experienced or ordinarily careful operator, will give as good results as any.

R. H., Mansfield, O.



By-pass for circulating water devised by R. H. with fuel consumption curve showing increased economy at higher temperatures

Install a Thermometer

THE simplest method of increasing the waterjacket temperature without adding to the work of the pump, is to deliver to the pump intake some of the heated water from the cylinder outlet. The amount supplied and, therefore, the cylinder temperature can be controlled by a simple gate valve, and the system, when properly laid out, is perfectly fool-proof.

Because of the wide variations in different installations, the exact layout and piping sizes cannot be specified, but the diagram indicates clearly the general plan, and the following suggestions should be carried out.

In the suction line to the pump connect a T (a) below which should be placed a check valve. Also place a T (b) in the outlet line from the waterjackets with one branch pointing upward. The connection overboard or to the exhaust pipe for the outlet water must be made from the vertical outlet of this T (b). The reasons for this will be explained later.

Connect the T (b) in the outlet to the one (a) in the suction line with a pipe in which is placed a gate valve or shut-off cock (c). This pipe may be $\frac{1}{4}$ " to $\frac{1}{2}$ " smaller than the inlet and outlet sizes, depending upon the dimensions of the connections, but this is unimportant as the valve controls the flow.

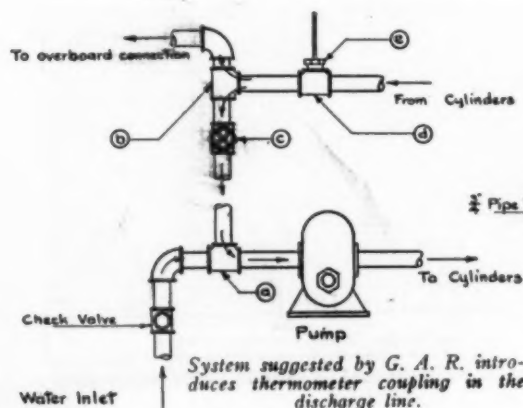
With the valve closed, the water circulates as usual, but as it is opened, the pump draws in some of the heated water from the outlet, along with the cold water, thus raising the temperature of the water fed to the cylinders.

If you have connected the water outlet to the upper branch of the outlet T as shown so that a greater head is required to make the water flow overboard than into the bypass line to the pump, there will be no possibility of trouble. Otherwise, the pump may suck in air if the control valve is left open when the engine is started.

If expense is not an item, purchase a thermostat control valve and put it in place of the outlet T (b), but leaving the control valve in the bypass line as an emergency measure. When properly installed and adjusted, this device will without any attention hold the engine temperature at the correct point under all conditions of running.

A thermometer in the outlet line is a convenience in regulating the temperature. This may be installed by placing another T (d) in the cylinder outlet line of 1" minimum size and inserting in this a thermometer well made up of brass as shown in Figure 2.

Place some cotton waste in the bottom of the well to act



as a cushion and insert a 6- or 8-inch chemical thermometer reading preferably from 100° to 220° F. Fill up the cup with oil which will transfer the heat to the bulb and you can determine at any time just what the water temperature is. The best point varies widely with different engines and must be determined by experiment.

G. A. R., New York, N. Y.

Use Cooling Water Over Again

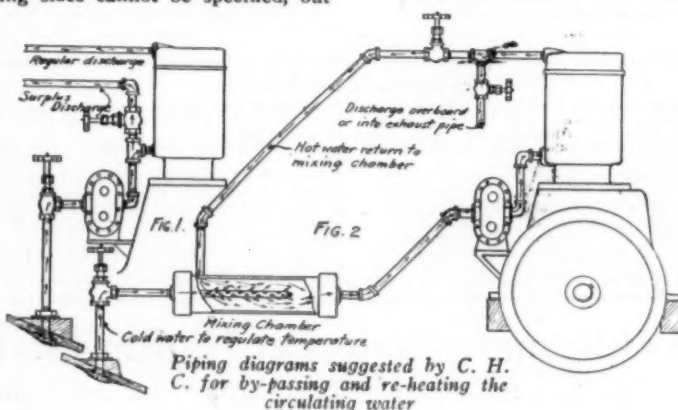
THE amount of cooling water supplied by the circulating pump, has in some cases been regulated or reduced by simply adjusting or partly closing the sea cock. This, however, is not a very good plan because any pump will work best and prove more reliable if allowed a full and unobstructed supply at the intake. A better plan would be to allow the pump to work at full capacity and then discharge overboard the water not needed for

effective cooling, before it enters the jackets. This can be done by providing an extra discharge or overflow pipe between the pump and jacket of cylinders. There should be a globe valve or stop cock in this pipe to regulate the amount by-passed or discharged overboard. Possibly another valve will be required to regulate the regular overflow also, but this will depend on the size of pipe, resistance through jackets and overflow pipe and height of outlet. Of course, if enough water is not discharged through this bypass with the valve wide open, then more resistance must be placed on the regular overflow through the cylinder jackets. This is easily done by installing another valve in this line. This arrangement puts no additional strain or resistance on the pump because the size of discharge pipe has not, or need not, be decreased, and there is perfect control over the amount of water supplied to the cylinder jackets. But this plan can hardly be considered the most effective or satisfactory way of cooling a marine engine because the temperature is regulated by a limited or reduced amount of cold water, depending on the season, while, for efficient operation, the jackets should be supplied with a liberal quantity of warm or hot water so that it will leave the jackets at a temperature of about 175° to 200° F. By circulating a quantity of this heated water, the cylinders can be safely run at a much higher temperature than otherwise, as they are more evenly cooled, and as less fuel is wasted in heating jacket water, the motor operating at the higher temperature shows greater efficiency.

The drawing shows how this hot circulating water might easily be provided for a marine engine by returning a portion of the overflow to a sort of mixing chamber, from which the pump draws its supply, using only enough cold water from the sea cock to regulate the temperature. The mixing chamber is made from a piece of 2- or 2½-inch pipe capped on each end, and is shown with the intake pipe extended into the mixing chamber and perforated so as to distribute and mix the cold water with the hot. Of course, where this system is used, the pump must be of liberal capacity because a larger quantity of the hot water will be required.

An arrangement is shown where the temperature is regulated by discharging the surplus water overboard or into the exhaust pipe before it enters the jackets. This plan would be quite inexpensive and easy to install, and would be quite an improvement over the usual unregulated cooling system, but

(Continued on page 116)



Can a Mixed Fuel Be Used?

Objections to the Use of a Kerosene Gasoline Mixture Are Many, and No Economy Will Result In the Final Account

Answers to the Following Questions Published in February Issue.

"Is it possible to use a gasoline-kerosene mixture as a fuel in an ordinary gasoline motor and if so, what proportion of each fuel and what special precautions in running are necessary?"

Mixed Fuels Not Advisable

(The Prize-Winning Answer)

GASOLINE and kerosene are both hydrocarbons, containing the same elements, but in different proportions. Both are derived from coal oil or petroleum by fractional distillation, and later by a process known as cracking by which much more gasoline is produced. From the nature of their origin we would expect them to possess many features in common, which investigation has shown to be true. They are agents for the production of work in the motor cylinder, and all work is the result of heat. Kerosene contains a greater number of B.T.U. (heat units) than gasoline, and all things being equal, we would expect a greater amount of work from a given quantity of kerosene than gasoline. To secure this equity in the same engine is hardly possible.

Gasoline holds first place as regards volatility; kerosene requiring heat to vaporize it rapidly. Even when perfect vaporization of kerosene and a mixture with air is obtained, the equity is still lacking. The comparative ease with which gasoline is vaporized, indicates a gas of great rapidity of combustion. When compared with a kerosene mixture, a measurable difference in time occurs between the beginning and completion of combustion in the two gases.

When the modern internal combustion engine designed for gasoline fuel is operated on a kerosene vapor, a marked decrease in power (at least 10%) results owing to the slower combustion of the kerosene vapor. Gasoline exerts its power as an intense impact with but little expansion; while kerosene continues to expand throughout a greater part of the stroke.

As the demand for the lighter grades of gasoline increased, mechanical engineers found that they could get greater power from their engines with a fuel which would enable them to gasify the lighter ends, and have enough heavy high vaporizing point material incorporated in them to be carried into the cylinder as a finely divided mist or fog. Chemical engineers set about to produce this ideal fuel by cutting the long series of hydrocarbons into a number of primary products and afterwards mixing them mechanically. Our gasoline of today is the result. Mechanical engineers then produced the modern carburetor to handle this fuel successfully.

This fuel, compounded for the purpose, used in a carburetor designed for it, gives an ideal combination. The fuel contains a sufficient per cent of low boiling point fractions so that the engine may be readily started when cold; enough high boiling point fractions to secure a foggy or misty vapor in order to obtain a high initial pressure at the moment of explosion, and the right proportion of intermediate boiling points to insure rapid combustion, and the greatest possible mass of vapor when the motor is hot. Can you expect to equal this fuel compounded by chemical engineers for a specific purpose as defined by mechanical engineers; by mixing gasoline and kerosene? Either one is a satisfactory fuel for the purpose intended, but when you mix them up, you upset the work of engineers who thoroughly understand their work.

A kerosene motor with its lower compression and water feeding device will operate very nicely on gasoline without the water; and a gasoline engine will operate on kerosene. A mixture of the two will operate either. Kerosene vapor requires a lower compression than gasoline, and when the two are mixed and used in a gasoline engine, overheating, knocking, preignition, hard starting, low flexibility at slow speeds and a sluggish pick up may be expected to a greater or lesser extent, according to the design of the motor and the proportion of kerosene in the fuel.

The new motors designed to operate on either gasoline or kerosene are really kerosene engines. With these you can mix them up as much as you like and still get satisfactory results. If you must use a mixed fuel in a gasoline engine, you can determine the proportions best suited to your motor by experiment. The design of the motor and carbureting device is an all important factor, and a mixture which was suitable for your friend's motor might cause you all kinds of trouble.

When experimenting with the fuel, start the motor on gasoline and let it warm up. Then try a 10 per cent mixture of kerosene. If, after standing a few minutes, the motor starts readily on this, increase the proportion of kerosene and repeat, until priming with gasoline through the pet cocks is necessary to get the motor started. The limit of kerosene in the mixture is now about reached and, if no trouble has been experienced, your proportions are about right for the warm motor. When starting with a cold motor, prime the cylinders through the pet cocks and also prime the carburetor with gasoline, using a squirt can at the air intake.

A hot air intake and a hot water jacketed carburetor are necessary for satisfactory operation, and provision for feeding a little water, as steam, should be made to prevent knocking and keep down the carbon deposits. Generally the air valve will require a lighter adjustment for the mixed fuel.

You can learn more from experimenting along the right lines, with your own motor, than pages of instructions can teach.

W. B. M., Newburgh, N. Y.

No Economy in Mixed Fuels

MUCH experimental work and study of the question of using mixtures of kerosene and gasoline has shown that, although the cheaper fuel can be used in small percentages in most engines, it does not pay to do this in the average pleasure boat engine for several reasons.

The principal one is that considering the amount of fuel burned per season by the average boat used for this service, the percentage of kerosene which can be mixed with the gasoline and burned efficiently is so small that the saving is negligible.

Kerosene is so difficult to vaporize in comparison with gasoline that the usual heating of the inlet air and hot water jacketing of the intake manifold, which is very helpful with the present day gasoline, is sufficient to evaporate only a small fraction of this fuel. Without the heated air or manifold, kerosene will scarcely vaporize at all.

If the fuel goes into the cylinder in a liquid state, it will not burn efficiently, and much of its value will be lost by incomplete combustion. Consequently, using kerosene mixed with gasoline in the average engine, instead of being a saving, usually is a waste. Incidentally, sooting of the spark plugs is a common occurrence.

One very serious trouble commonly resulting from the use of kerosene is due to the unvaporized fuel mixing with and diluting the oil film on the cylinder wall. Some of the fuel works past the rings into the crankcase and thins out the oil there, destroying its lubricating properties. The result is that unless the oil is drained and renewed very frequently, rapid wear and damage to the working parts is certain to result. The expense of renewing the oil and repairs must, therefore, be balanced against the reduction of fuel cost using kerosene.

When kerosene-gasoline mixtures are used in two engines, the lubricating oil must be fed to the cylinder

(Continued on page 116)

Questions and Answers on Lesson No. 1

Rules of the Road, Rights of the Way, Proper Whistle Signals, Duty When Underway, Day and Night Sailing

Names of those who passed papers submitted during February will be found on page 115

1. Q: What are the objects of the rules of the road?
A: *To prevent collisions at sea or on the water.*
2. Q: When do the rules of the road apply?
A: *To all types of vessels when under way.*
3. Q: When is a boat under way?
A: *When she is not at anchor, aground or made fast to the shore.*
4. Q: Is a boat adrift subject to the rules?
A: *Yes.*
5. Q: Is a boat not under control subject to the rules?
A: *Yes.*
6. Q: To what type of boats or vessels do the rules apply?
A: *To all types, to all forms of floating craft.*
7. Q: If there is doubt as to whether the rules apply in any particular case should you consider that they do?
A: *Yes.*
8. Q: What is the boat called which has the right of way?
A: *Privileged vessel.*
9. Q: What is the boat called which does not have the right of way?
A: *Burdened vessel.*
10. Q: What is the duty of the right-of-way boat?
A: *Hold her course and speed.*
11. Q: What is the duty of the burdened vessel?
A: *Adopt every known means to keep out of the way of the privileged vessel.*
12. Q: (a) Is a departure from the rules ever allowed?
(b) When? (Give an example in your own words.)
A: (a) *Yes.*
(b) *In bad weather or any condition leading to a collision. When the burdened vessel alone cannot prevent a collision, the privileged vessel should change her course.*
13. Q: Is there any special burden placed upon motor boats when there is danger of collision with a large commercial boat? Explain.
A: *Yes, as they are small and readily maneuvered.*
14. Q: What is your idea about the proper speed of motor boats?
A: *Reasonable speed with reference to the place and time. She should be able to readily change course from headway to sternway.*
15. Q: What are the rights of fishing vessels?
A: *All boats when under way must keep out of the way of fishing vessels and must not disturb them with their wash. They, however, cannot fish in channels or fairways.*
16. Q: When should whistle signals be given?
A: *When danger of collision exists.*
17. Q: When should whistle signals not be given?
A: *Never give them in fogs, heavy snow or rain and not to sailing vessels.*
18. Q: What should passing signals be given on?
A: *Whistle.*
19. Q: Must a whistle signal be answered?
A: *Yes.*
20. Q: When is a signal of one blast given?
A: *One blast—port side to port side—1 blast in answer to 1 blast.*
21. Q: When is a signal of two blasts given?
A: *Two blasts—starboard side to starboard side—2 blasts in answer to 2 blasts.*
22. Q: When is a signal of three blasts given?
A: *Three blasts when you are backing.*
23. Q: When is a signal of four blasts given?
A: *Four blasts means danger.*
24. Q: What do you do if you do not understand a whistle signal?
A: *Stop, reverse, blow 4 blasts and do not proceed until signals are understood.*
25. Q: What is a cross signal?
A: *One blast answered with two or two blasts with one.*
26. Q: What do you do if a cross signal is given?
A: *Give danger signal, stop and straighten out signals.*
27. Q: Are a vessel's rights altered by whistle signals?
A: *No.*
28. Q: (a) If a boat gives you a signal which is in violation of your rights, what do you do?
(b) What should the other boat do?
A: (a) *Give danger signal and stop, or answer her signal and give her permission to proceed.*
(b) *If you have given permission she can proceed—otherwise, if you have given danger signal, she must stop, and signals must be given and understood.*
29. Q: What whistle signals and action are proper for boats?
(a) Meeting head on?
(b) Crossing obliquely?
(c) Courses in opposite direction but parallel?
(d) Courses in same direction but parallel?
(e) Overtaking?
(f) Both crossing and overtaking?
(g) Boats backing?
(h) Boats coming out of slip?
(i) Boats meeting in winding channel?
(j) Motor boat meeting sail boat?
A: (a) *One blast—port side to port side.*
(b) *One blast—privileged boat to hold her course and speed and burdened boat slow down and pass astern.*
(c) *Courses parallel and boats far enough to starboard of each other to pass clear. Two blasts answered by two blasts. Both boats hold course and speed.*
(d) *Keep out of way unless one boat desires to cross other's course then give proper signals.*
(e) *Overtaking vessel is burdened vessel and she must ask permission—one blast to starboard and two to port.*
(f) *Same as e.*
(g) *Three blasts—and then signals are same as going ahead—stern considered bow for the time being.*
(h) *One long blast.*
(i) *One long blast and boat going up stream should stop and wait for other boat to pass.*
(j) *No signals—motor boat must keep clear.*
30. Q: What special precaution is to be taken when a boat is operated by both sail and power at the same time?
(a) In the day time?
(b) At night?
A: (a) *Same status as motor boat and should give signals accordingly.*
(b) *At night the status of sail boat and carries red and green sailing lights only and does not use whistle.*
31. Q: What are the rights and duties of tow boats with a tow?
A: *Boats with tow considered one boat and rules apply to it—however, being very awkward to handle motor boats should keep out of way and not insist on right of way.*
32. Q: What is one's duty in case of collision?
A: *Stand by and give every assistance without endangering herself and crew and if involved in collision, give name, port and so forth.*
33. Q: Should whistle signals be given when there is no danger of collision?
A: *No.*
34. Q: What is the danger zone—where is it—what should a boat do that is in your danger zone?
A: *Danger zone is your starboard bow from dead ahead to two points aft your starboard beam. She should hold her course and speed.*
35. Q: Do war vessels have any special rights?
A: *War vessels, strictly speaking, have no special rights; however, motor boats should not attempt to force their right of way on them.*

BEGINNING in this issue, we start to comment on the answers received to the Correspondence Course Questions. Lesson No. 2 will be considered in May MoToR BoatinG; Lesson No. 3 in our June number, etc.

Upon reviewing the answers received to the Questions of Lesson No. 1, it does not appear that any lengthy comment on this lesson is necessary by us. The answers were nearly all 100% perfect and indicate that the students fully understand the subject of the Rules of the Road, Rights of Way, and Proper Whistle Signals. Therefore, it seems to us that the best way of reviewing Lesson No. 1 will be simply to print the original questions and their correct answers.—Editor.

Universal, the Popular Small Motor

Showing the Adaptability of the Small Marine Motor to Boats of Many Sizes



A runabout built in Japan as a stock boat, powered with a Universal motor



At-a-Boy, P. M. Lown's Universal powered flyer, which performed remarkably well at the Peoria regatta



Large boat owned by R. M. McDonald and used continuously at Cristobal in the Canal Zone

THERE are small motors—and small motors, but for general adaptability and all around utility one will have to go a great way before finding a motor of such universal suitability as the little Universal marine motor of 9-12 h.p. Our illustrations show a variety of boats of all sizes and types which are working satisfactorily in all parts of the world. From a stock runabout, built in Japan by an enterprising Japanese boat builder who has selected this little machine as most suitable to a heavy cruising boat on the Potomac, these boats all secure satisfactory service from their little Universal power plants.

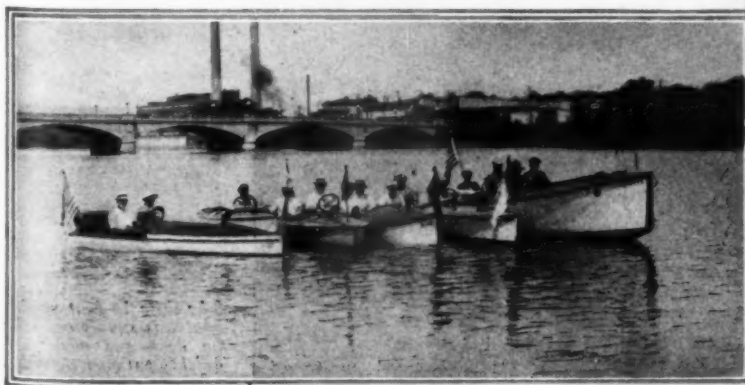
This little motor is a thoroughly standardized product and one which its builders are content to leave in its present

J. A. Dorsey's cruiser is a big boat to drive with a Universal motor



form without continual changes in the model. As a result of the thorough standardization it will give to the user the maximum of service. It was designed with a very definite object in view and that was to supply the need for a standard type motor which, after being properly designed in the beginning with complete shop equipment for economical manufacturing, could be held and maintained without further change.

The standard of quality maintained in a plant which specializes on the production of only one model can be kept high. All parts are made to an identical exactness since they are all built and cast in the plant.



A group of fast little runabouts at Waterloo, Ia., all powered with Universal motors

Gasoline as Aid to the Sailboat

The Most Enthusiastic Sailor Will Find Himself Becalmed at Times When the Aid of a Small Power Tender Proves Useful

THE most enthusiastic supporter of wind power is liable to be let down when the wind fails. The handling of sail craft, however, is not an art to be discouraged. It promotes both alertness and patience, readiness of resource as well as initiative. And there is no greater satisfaction than in making a destination by a successful struggle against adverse elements, and in getting there in spite of contrary winds.

These were the principles that inspired Roger Griswold and Harold Peters, the builders of the schooner Lloyd W. Berry, when they designed their vessel upon the plane of the Gloucester fishing schooners but reduced to the length of less than twenty meters.

It was definitely decided she was not to have a motor installed, nor was she to carry paid hands.

The desirability of power, however, was fully conceded in case of calms. A small power boat, therefore, was specially designed of a suitable size to carry on deck without over-encumbering deck space.

The small yard at Thomaston, Maine, that built the yacht built the power boat also, using white pine planking on oak framing. She is an open boat 14 feet long, her power-unit being a small two-stroke engine, a Hartford 5 h.p. model X made by the Gray & Prior Machine Company, Hartford, Conn.

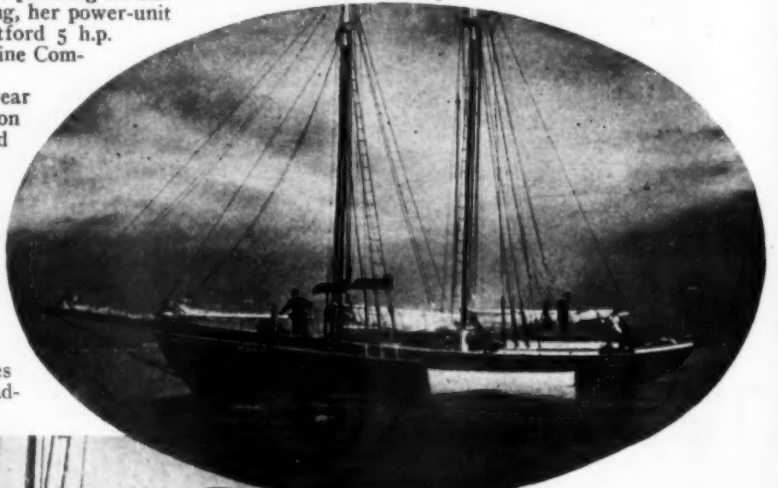
The yacht, launched a little over a year ago, has already made a good reputation for herself, her builders, her crew, and her sailmaker, in the accomplishment of a voyage from Boston to England and Gibraltar. It was the writer's privilege to sign on aboard the schooner for the voyage from Southampton to Gibraltar to fill up a vacancy in the crew. He was the only Englishman with five Americans consisting of the two owners and their personal friends.

Looking back now upon the voyage, which was very full of severe vicissitudes and unfavorable weather, it must be ad-

mitted that most of the pleasurable circumstances were associated with the yawl-boat, as the little power boat was usually called. It was, thanks to the yawl-boat, that we were enabled to get ashore at all at Plymouth, where we lay for nearly three weeks while one southwest gale followed another. The other boat carried was a small, lightly built dinghy, capable of carrying four passengers in smooth water, none at all in a seaway. At Plymouth some iron ballast was taken out to alter the schooner's trim. This meant that compasses had to be adjusted. The first attempt to do this was made at anchor. But the little yawl-boat was unable to turn the vessel through more than half a circle against a stiff wind. But a day or two later the wind fell light enough to tow out into the sound, the motor boat secured alongside. And in this manner the vessel was manoeuvred to the complete satisfaction of the compass adjusting expert.

At Falmouth the pace she made against a heavy wind or sea was something of a surprise to everyone. And the con-

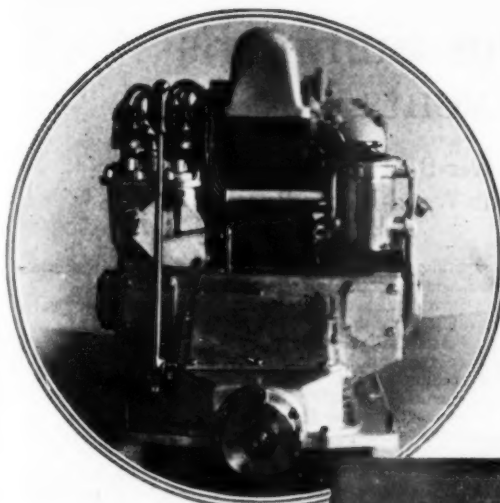
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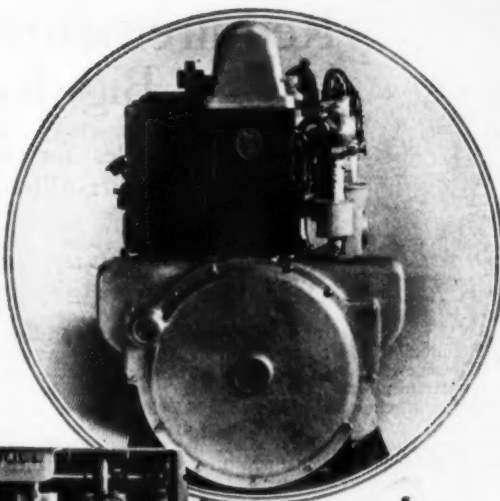
The steam tug was surprised to observe the little motor boat moving the schooner to a safe anchorage in a calm



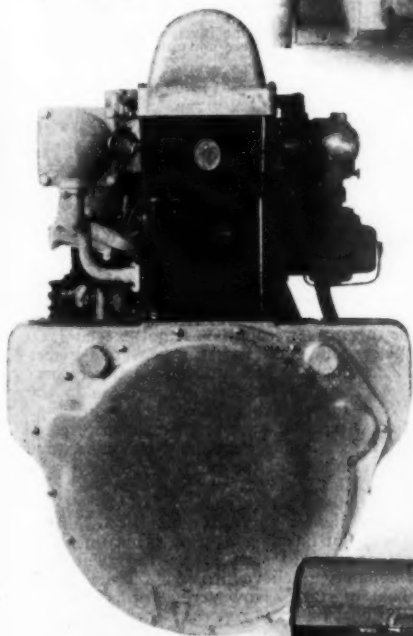
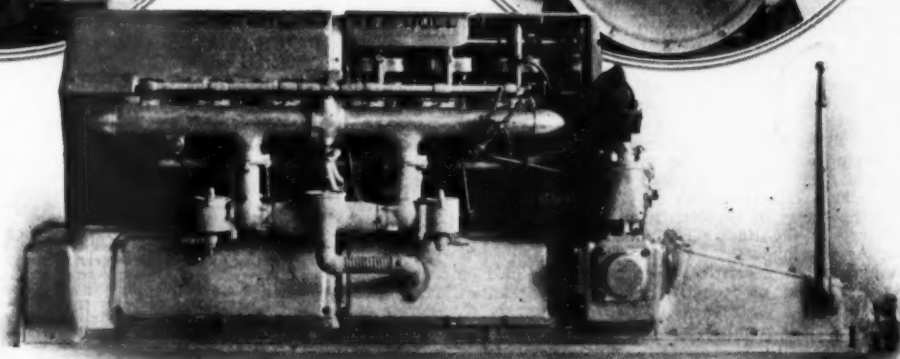
The little 14-foot yawl-boat was snugly carried on deck and could be quickly put over the side



The compact appearance of the new Sterling Sea-Gull motor is apparent from the views taken from the after and bow ends. This motor is built in a size with 4 11/16 in. bore and 6 in. stroke and rates at 150 h.p.



The port side of the Sea-Gull showing the simplicity of the manifolding and the accessibility of all parts. The overhead camshaft operates the valves and is driven by bevel gears. Removable cylinders are fitted into the one-piece cylinder block casting.

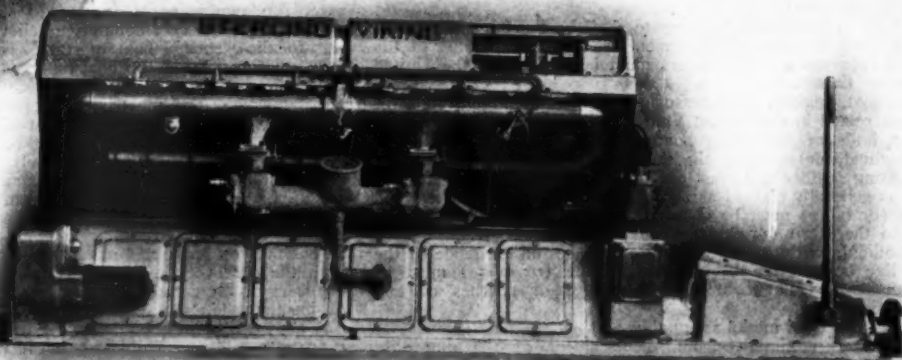


Sea-Gull and Viking

The Newest Sterling Marine Motors Are Now Designated by Appropriate Names Derived from the Sterling Coat of Arms

Port side of the heavy duty Viking motor which is the last word in powerful marine units. These motors are fitted with dual valves and special aluminum alloy pistons which have performed successfully under severe tests. The horse-power rating exceeds any previously attained in motors of a similar displacement.

The bow view of the Sterling Viking motor, their newest heavy duty machine. Similar in design to the smaller motor above, its bore and stroke is 7 by 8 1/2-in. and at its normal rating of 1,200 revolutions will develop in excess of 300 h.p.



Requirements for This Summer's Big Racing Events

The New Rules for the American Power-Boat Association
Gold Cup, Fisher-Allison Trophy and the Wood-Fisher Races

Conditions for 1922 Gold Cup Races, Detroit, Mich., Aug. 26, 28, 29

ANY person, persons, group of persons or permanently organized club or association in North America, which is a member of the American Power-Boat Association, having a regular membership of twenty-five or more, and devoting its attention in whole or in part to the development of power boats and to the promotion of the sport of racing boats or yachts of that character, shall always have the right to challenge for the cup and to run a match therefor, provided such challenge shall be made and such match shall be run in accordance with the terms and conditions of the Deed of Gift.

All matches shall be run under the rules and regulations of the American Power-Boat Association governing sanctioned races.

All challenges must be made in writing, signed by the person challenging or Secretary (or proper official) of the challenging club and must be forwarded to the Secretary of the American Power-Boat Association. A copy of the challenge must be sent to the Secretary of the club holding the cup and a copy to the Secretary of the Racing Commission of the American Power-Boat Association.

A match shall consist of three races to be held on consecutive days, excluding or including Sunday, as the local committee may rule.

Courses shall not be less than twenty nor more than forty statute miles.

Courses shall be laid in water of not less than two fathoms, and as free from turns as practicable, but the finish must be at the starting line. Each lap or round of the course shall not be less than 2 statute miles. The course shall be approved by the Racing Commission who shall have power to accept or reject same.

The start shall be a one-gun flying start, with a preparatory signal to be given five minutes before the starting time. The time of start shall be sufficiently early to allow the slowest boat to cover the course and finish before one hour after sunset, barring accidents. A boat shall not be allowed to start in any particular heat after the first boat has finished.

The winner of the match shall be determined by the point system, whereby each boat entering and finishing a race of a match receives one point for entry and one additional point for each boat which she defeats, the winner being the boat scoring the highest aggregate number of points in all the races of the match. In computing points the maximum number of entrants shall be deemed racing each day and those that do not start shall be counted as defeated boats. A boat which starts in a race, but does not finish before one hour after sunset, shall receive no points for that race, but shall be counted as a defeated boat in that race by the boats finishing. In case two or more boats have scored the same number of points for the series, thus establishing a tie, the match shall be awarded to that one of the tied boats which has covered the course in the best total elapsed time for three races.

A boat to be eligible to compete shall be the bona fide property of one or more amateur members in good standing of the club it represents. The owners must be citizens of the United States or Canada.

The boat, engine, and accessories must be manufactured, built or constructed in the United States or Canada.

The hulls of competing boats must have no breaks in the longitudinal continuity of the immersed surface, not more than one lifting surface and must conform to the committee's ideas of what is generally classed as a Displacement type. The keel and chine (or bilge) must be continuous and must extend from the bow to the stern (or stern post). Steps, either transverse or longitudinal, will not be permitted. Surfaces on each side of the keel line between the keel and the chine (or bilge) must be continuous and not contain breaks, jogs or notches of any description.

Note—Sea Sled model acceptable.

The total maximum piston displacement of the motor in boats competing for this Trophy shall not be more than 625 cubic inches.

Boats competing for this Trophy shall not have a waterline length of less than 25 feet.

Boats competing for this Trophy shall not have a waterline beam at their widest section of less than 5 feet.

Competing boats must exhaust at the stern or under water when underway.

Competing boats shall be fitted with at least two transverse bulkheads, have the motor compartment entirely closed in and have seating accommodations for at least four persons.

No postponements from the advertised time of start of the race shall be allowed for any cause.

Competing boats shall be equipped with an efficient reverse gear.

An entry fee of \$25.00 shall be charged which must accompany entry, same to be returned to the owner if the boat starts in one or more heats.

Competing boats must carry full equipment in the race, including floor boards, seating equipment for four persons, etc.

A competing boat shall not be equipped with a gear box.

NOTE—The Council unanimously instructed the Racing Commission that the action taken at the annual meeting of the American Power-Boat Association in prohibiting gear boxes must be interpreted to mean not only gear boxes with a step-up gear ratio, but gear boxes with a one to one ratio, and any form of device to increase or decrease propeller speed above or below engine speed.

It was further ruled that the propeller shaft must be in line or nearly in line with the crank shaft and rotate at exactly the same speed, and that the function of any reverse gear or clutch used shall not be different from the ordinary use of a reverse gear, that is, to reverse direction of the rotation of the propeller or for the purpose of idling. In other words, no device for stepping-up propeller speed shall be included in the reverse gear or any other form of gear box.

(Any synchronizing devices aft of the engine involved only in driving twin screws from one engine at engine speed are not to be considered gear boxes under this rule.)

The Fisher-Allison Trophy Races at Hamilton, Ont., August 17, 18 and 19 and the Wood-Fisher Races at Detroit, August 26, 28 and 29

COMPETITION for both the Fisher-Allison and the Wood-Fisher Trophies is open to displacement boats of not less than 32 feet waterline length. The motor or motors in the boats competing for the former trophy must not exceed 3,000 cubic inches piston displacement, while those in the Wood-Fisher race must not exceed 2,250 cubic inches. Motors in the Fisher-Allison race must be stock marine motors, while those in the boats racing for the Wood-Fisher Trophy, may be of any type either marine or aviation, American or foreign manufacture.

Both races consist of three 50-mile heats held on consecutive days. The winner is determined by the point system whereby each boat entering and finishing a heat receives one point for entry and one point for each boat which she defeats, the winner being the boat scoring the highest aggregate number of points in all three heats. A boat not finishing a heat within one hour after sundown is not permitted to start in a subsequent heat except where the race committee believes it is for the best interests to allow such a boat to start. However, in order to start in a subsequent heat, the boat or boats representative must have reported to the race committee before the boat withdraws from the race-course and must have received permission to withdraw.

In both the Fisher-Allison and the Wood-Fisher races, only minor repairs to hull, power plant or accessories, are allowed. Allowable repairs must be made only by members of the crew and must be made during racing time. Repairs and materials for minor repairs must be taken from those carried aboard the boat during the race. A boat which receives permission from the race committee to withdraw from the race-course must take an observer on board and must make the necessary minor repairs with the observer on board. These repairs must be made by members of the crew and with parts and tools carried on board during the race.

A boat which does not finish, counts as a defeated boat for the race and receives no points for the heat. A boat which does not finish a heat but is allowed to start in a subsequent heat, takes a penalty of one point for the privilege of starting in the next heat. A boat crossing the finish line of any heat must immediately

(Continued on page 115)

Jada, Hailing From Boston

An Interesting Example of the In Replacing Old Power Plants With

creased Efficiency to Be Secured by the Last Word in Gas Engineering

Photographs by N. L. Stebbins



Jada curls a pretty bow wave when travelling at 24 knots

OF the many cruisers hailing from the port of Boston, Jada is one of the fastest and finest. Built by Lawley in 1920 for Charles L. Harding of Boston and powered with a pair of the Model F six-cylinder Sterlings, Jada was thought to be one of the neatest outfits in those waters. But, repowered this season with a pair of the dual valve six-cylinder Sterlings, which were placed exactly on the original engine bed and get delivered a total of 150 additional horsepower, Jada's speed went up to 5 miles an hour more and she is now able to maintain 23 to 24 knots without exceeding 1,500 revolutions with her engines.

As Mr. Harding states: "That's fast enough for me."

This cruiser is 56 feet long, 11-foot 3-inch beam, 2-foot 9-inch draft. Her twin engines are turning 22- x 24-inch Columbian propellers about 1,500 revolutions maximum. At

least they have never been permitted to exceed those revolutions, although it is known that the engines can turn these same wheels up faster. It is a significant thing that, although only 5 3/4-inch bore, these two six-cylinder Sterlings aggregate 450 horsepower.

The previous pair of motors were of the T-Head type,



The bridge deck and engine controls of Jada



Interior of the forward cabin

while the present pair are of the dual overhead valve series and the additional horsepower is delivered at the same number of revolutions. This is accomplished by increased efficiency in the combustion chamber. It does not require any increased effort from the engines nor any increased number of revolutions to attain the additional power and speed.

Jada has a large bridge deck amidship beneath which the engines are installed, a commodious forward cabin and a slightly larger after cabin, followed by a sunken cockpit. She is a round bilge type of cruiser and curls as pretty a bow wave as any cruiser that ever hailed from Boston.

Yard and Shop

Notes of Interest to Both Owner and Manufacturer

A Dependable Motor

The advantages of standardization as applied to marine motors is well illustrated in the little motor being built by C. N. Cady of Canastota, New York. Every part of this motor can be duplicated in any garage where parts for the Ford car are to be had. This does not mean that the motor is at all similar to an automobile engine since it has been designed particularly for marine use. The similarity comes in only in the sameness of cylinder sizes and shaft sizes. Naturally the standard pistons will fit this machine as well as the bearings and other moving parts. There has long been a need for a small dependable motor of this nature and those which have been in service have fulfilled every expectation. It has been thoroughly tested in boat service and has completed long trips without a stop or a skip.



An airplane view of the Hall-Scott properties at Berkeley, Calif. This picture was made from a captured German plane in which a Hall-Scott 200 h.p. aviation motor had been installed. It made the journey from Chicago to Los Angeles in 18 hours and 10 minutes and delivered photographs to newspapers. Hall-Scott motors are able to travel exceptionally fast both in the air and in the water

the limited facilities of the ordinary small cruiser. These stoves have been extensively used in off-shore service and their reliability is essential to serving well cooked meals at regular hours. The canned food habit so common on small boats can thus be eliminated.

Better Dry Batteries

A new and revolutionary type of dry battery designed especially for heavy duty service is being distributed by the Twin Dry Cell Battery Company, of Cleveland, Ohio. Its construction is a decided improvement in dry cell building and it will render much better and longer service than any dry cell heretofore made. Due to the type of construction and the much larger zinc surfaces employed a greater efficiency is secured. Both zinc anodes in the twin dry cell are within the cell and are not used around the battery material as is the common practice. Both sides of the zinc strips are exposed to the action of the electrolyte and consequently twice the area of zinc is available for current production. The batteries can be made absolutely water tight and connected in series without danger of short circuiting as no exposed zinc can make accidental contact. Owing to their water proof features they are particularly suited to marine service as moisture and dampness have no effect whatever upon them. The cells have a longer service life and higher recuperative properties and will maintain the highest voltage under load. By reason of their rectangular shape they are more easily placed in battery boxes and also more readily connected.

The Hess Mono-Marine

One of the sturdiest little power plants on the market today is the Hess Mono-Marine engine being built at Algonac, Michigan, by the Hess Motor Company. This little engine has

ample power to propel boats up to 30-feet in length and is so simply constructed that any unskilled user can operate it. An important feature is the fact that all such parts as the piston, piston rings, the connecting rods, valves, and springs, timing gear, carburetor and ignition parts are interchangeable with similar parts used on the Ford engine. This insures quick replacement in case of accident in any parts. The bore and stroke are $3\frac{1}{4}$ by 4-inches which enable the machine to develop about 5 h.p. when running at 950 revolutions.

Ninety Years A Clock Builder

Back in 1832 Daniel Pratt started to manufacture clocks in Reading, Mass. There were no railroads or power available and crude contrivances were used in the manufacture. Wooden wheels were used and to this day some of these clocks are still in service.



The 25-foot Fay & Bowen sport model which is a V-bottom runabout powered with an L.N.43 Fay & Bowen 50-h.p. motor. It will develop a speed of 23 m.p.h.

Kerosene Oil Stoves

Owing to the increasing demand from all sections of the country for the kerosene oil stove which has been distributed locally for many years, Elisha Webb & Sons Company of Philadelphia, Pa. have found it necessary to enlarge their capacity and arrange for increased production. The burners used on these stoves are believed to be the best on the market and they are further equipped with accessory fittings particularly suited to the stoves. For use on small boats they are eminently satisfactory and a three or four course dinner can be served piping hot with



The interior construction of the Twin dry cell. The unusual area of zinc makes the battery highly efficient

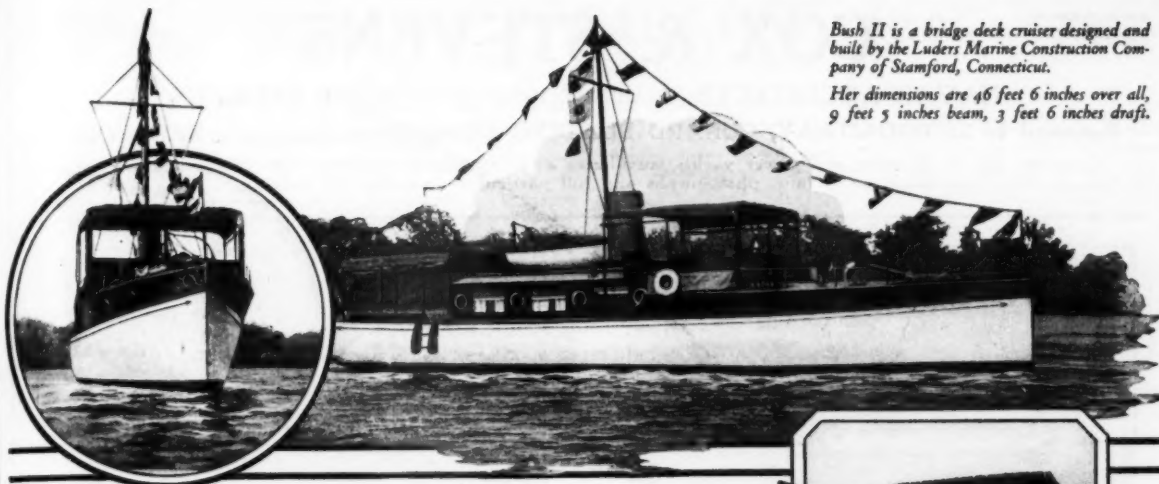


The two-burner kerosene stove made by Elisha Webb & Sons of Philadelphia. Fitted with an oven and a nest of pots as shown, a full course dinner can be served on the smallest motor boat

One clock was all that went into any one neighborhood and it was many years before they became common. The first sales room in Boston was established (Continued on page 115)



A commercial fishing boat built by the Eureka Boat Company, Key West, which uses a Kermath Venadium 20 h.p. motor. This boat has created unusual interest on account of the high speed motor installed. Usual practice is to use slow speed motors of large size



Bush II is a bridge deck cruiser designed and built by the Luders Marine Construction Company of Stamford, Connecticut.

Her dimensions are 46 feet 6 inches over all, 9 feet 5 inches beam, 3 feet 6 inches draft.



Valspar Bronze Bottom Paint Keeps Your Boat "Clean as a Whistle" All Season

Mr. August C. Buscher, of New York, is one of the many yachtsmen who have eliminated mid-season scraping. In speaking of his experience with Valspar Bronze Bottom Paint, Mr. Buscher says,

"I have used Valspar Bronze Bottom Paint for three seasons on my boat, *Bush II*, and on hauling out at the end of the season have found her to be entirely free from barnacles and other sea growth.

"I have found that this paint flows freely under the brush and covers a great deal of surface. I gladly recommend it to anyone who wishes to eliminate mid-season hauling out, as the Spring painting is sufficient for the entire season.

"For a number of years I have been experimenting with bottom paints of all kinds, but have yet to find one equal to Valspar Bronze Bottom Paint, for both durability and anti-fouling properties."

Valspar Bronze Bottom Paint is a compound of Valspar, the tough and durable waterproof varnish, with pure French Leaf Bronze. Two coats of this absolutely anti-fouling paint in the Spring will keep the bottom of your boat clean as a whistle all season.

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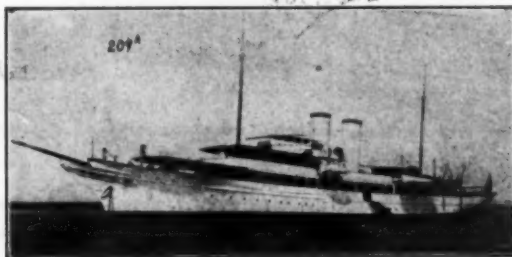
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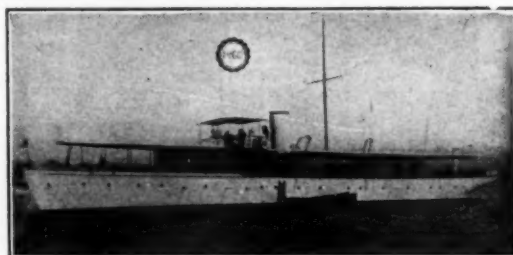
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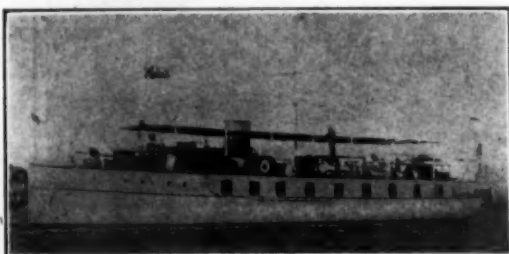
Complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request.



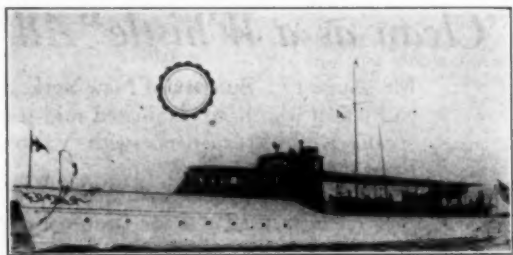
No. 209—For Sale or Charter—Large seagoing steam yacht. Exceptional speed. Roomy accommodation. Completely reconditioned recently. Unusual opportunity. Cox & Stevens, 25 Broadway, New York.



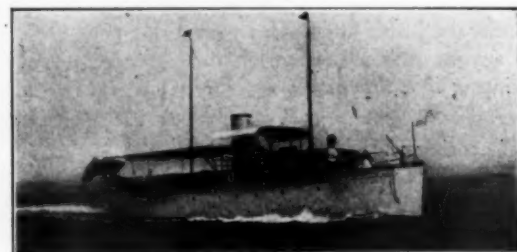
No. 1466—For Sale or Charter—Particularly desirable 140 ft. twin-screw steel cruising power yacht. Speed up to 18 miles. Dining saloon and social hall on deck; 3 double and 1 single staterooms, 3 bath and toilet rooms, etc. Recently overhauled thoroughly at large expense. Cox & Stevens, 25 Broadway, New York.



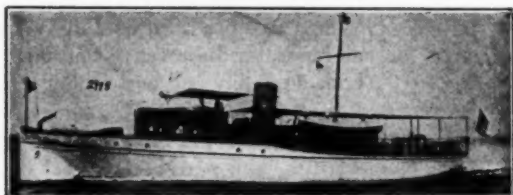
No. 1662—For Sale or Charter—Attractive 90 ft. twin-screw gasoline houseboat; speed 10-12 miles. Large saloon, four staterooms, two bathrooms; all conveniences. Handsomely furnished. Cox & Stevens, 25 Broadway, New York.



No. 1230—For sale at low figure—Fast 104 ft. twin-screw cruising power yacht. Speed up to 18 miles; two 6 cyl. 200 H.P. "Speedway" motors. Deck dining saloon, main saloon, two double staterooms, shower bath and two toilet rooms, etc. New furnishings 1920. Cox & Stevens, 25 Broadway, New York.



No. 3489—For Sale or Charter—Modern, handsome, flush deck, twin-screw cruising power yacht; 90 ft. 7 in. overall, 16 ft. 3 in. beam, 5 ft. 2 in. draft. Launched August, 1917. In excellent condition; remarkably able craft. Unusual deck space. Best construction. Speed 13-14 miles; two 115 H.P. 6 cyl. Winton motors. Deck dining saloon with large pantry adjoining, (galley below deck); aft are owner's stateroom (full width of vessel), one double and one single guest's stateroom, vestibule with berth, bathroom and guest's toilet room. Attractive figure accepted for immediate disposal. Cox & Stevens, 25 Broadway, New York.



No. 2978—For Sale—Desirable twin-screw cruising power yacht; 80 x 14 x 4 ft. Speed 13 miles; two 50-60 H.P. Twentieth Century motors new 1919. Dining saloon, two double staterooms, bathroom and two toilets, galley, etc. Recently thoroughly overhauled at large expense. Cox & Stevens, 25 Broadway, New York.



No. 2690—For Sale—Attractive and roomy bridge deck cruiser; 63 ft. x 13.6 x 4 ft. Speed 11 miles; 50/65 H.P. "20th Century" motor. Saloon with two extension berths, double and single stateroom, bath and toilet room, separate galley full width of boat, etc. Inspectable near this City. Price and further particulars from Cox & Stevens, 25 Broadway, New York.



No. 3477—For Sale—Fast bridge deck cruiser; 43 x 9 x 3.6 ft. Speed up to 17 miles; 130-150 H.P. 6 cyl. Speedway Motor. Saloon, double stateroom, two toilets, galley, etc. Splendid boat for ferry or day service. Price low. Cox & Stevens, 25 Broadway, New York.



No. 4048—For Sale—Practically new, handsome, fast, twin screw cruiser; 64 x 12.6 x 3 ft. 6 in. draft. Speed up to 19 miles; two 8 cyl. motors; electric starters. Enclosed bridge with full motor controls. Dining saloon, two double staterooms, toilet room, galley, etc. Probably roomiest boat of type and size available. Price attractive. Cox & Stevens, 25 Broadway, New York.

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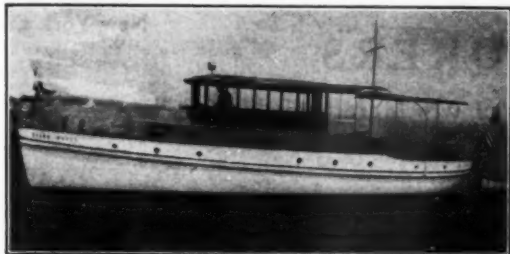
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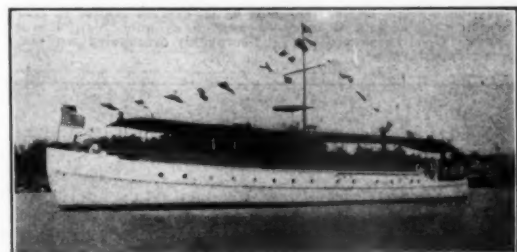
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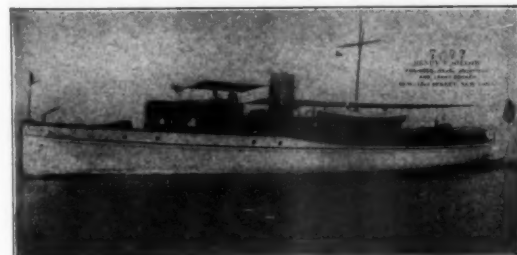
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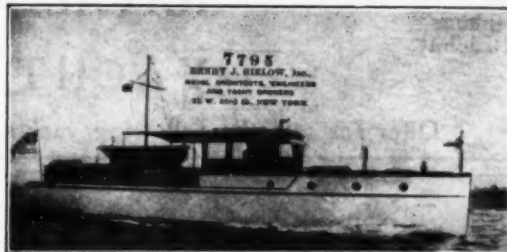
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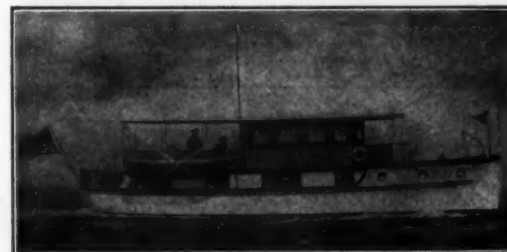
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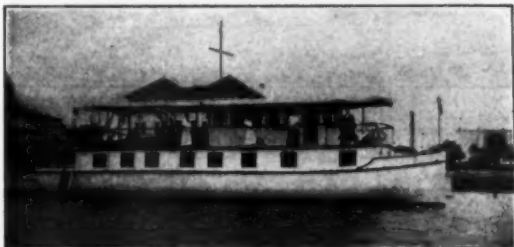
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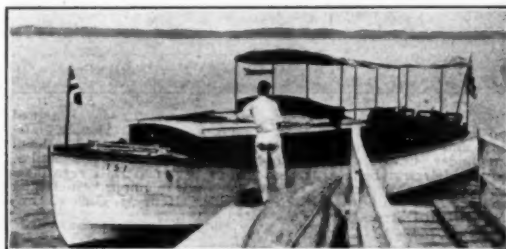
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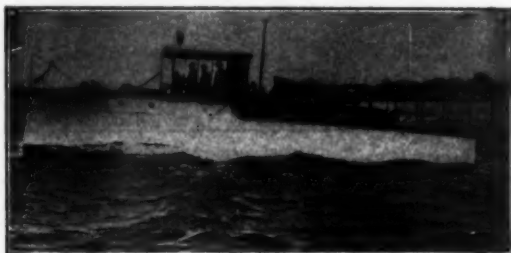
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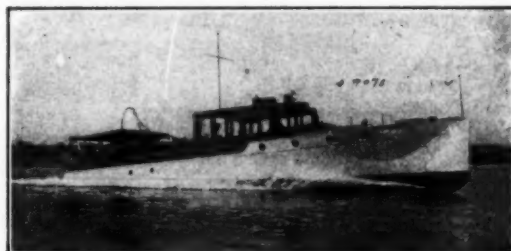
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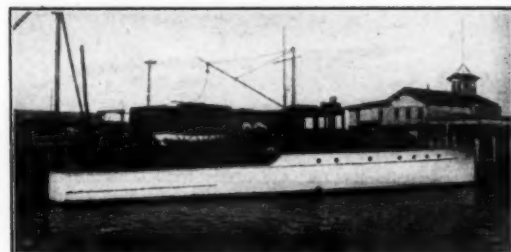
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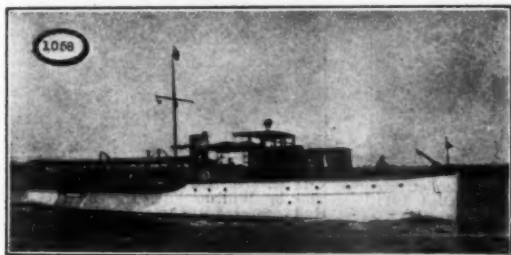
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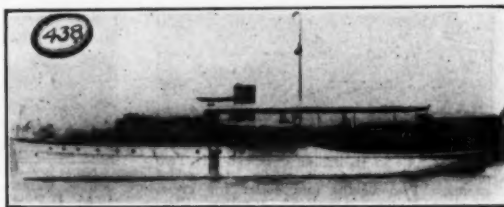
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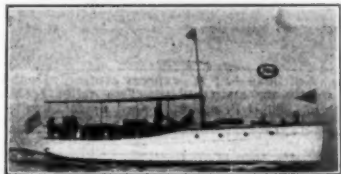
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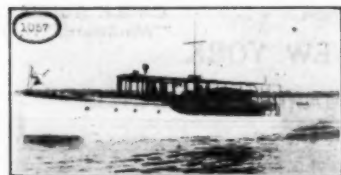
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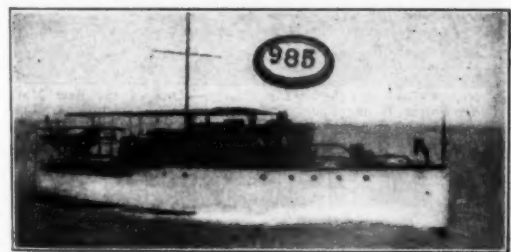
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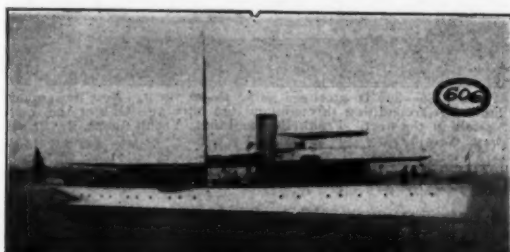
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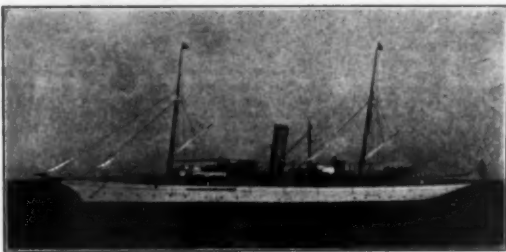
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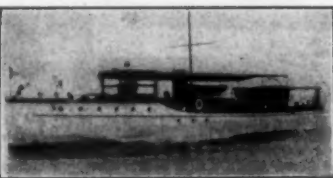
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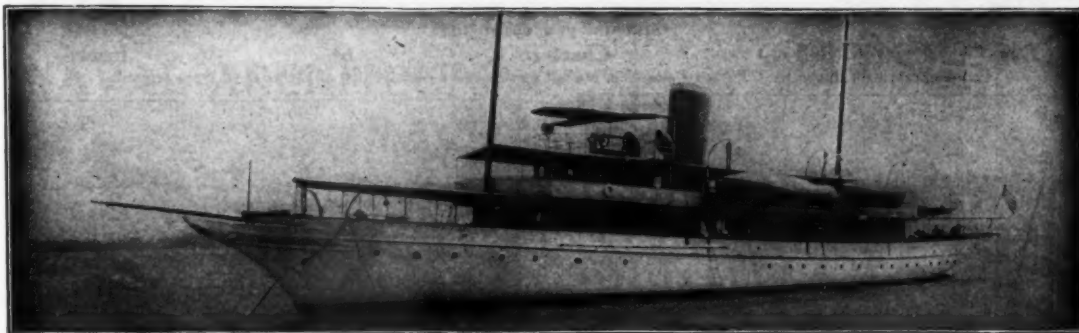
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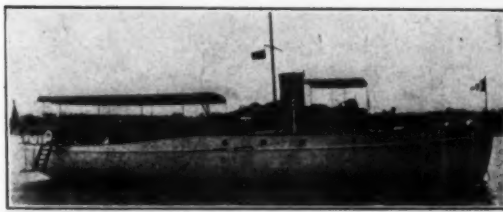
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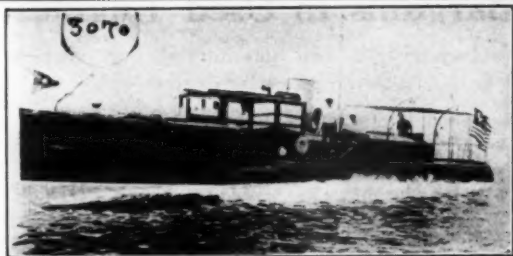
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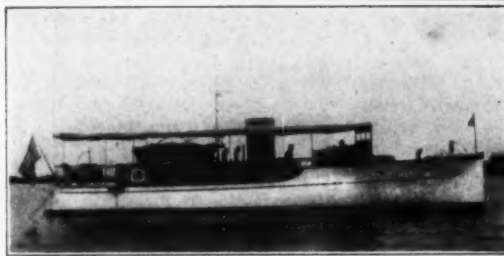
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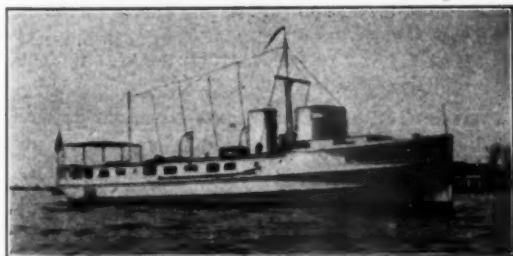
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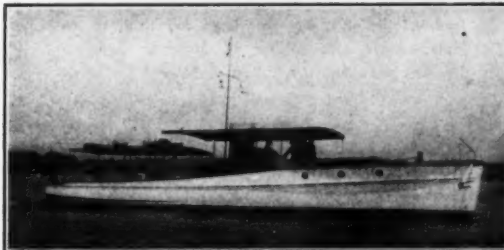
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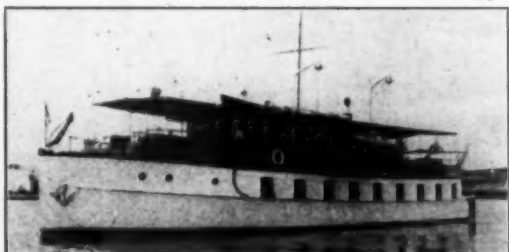
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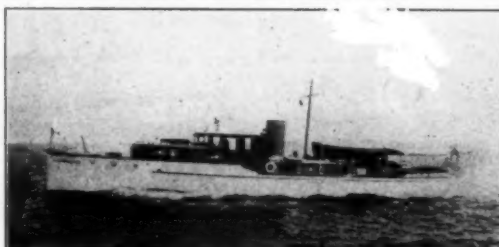
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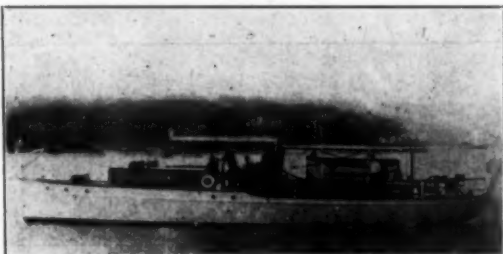
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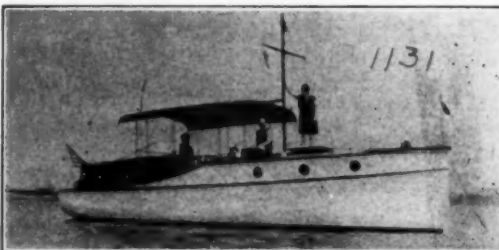
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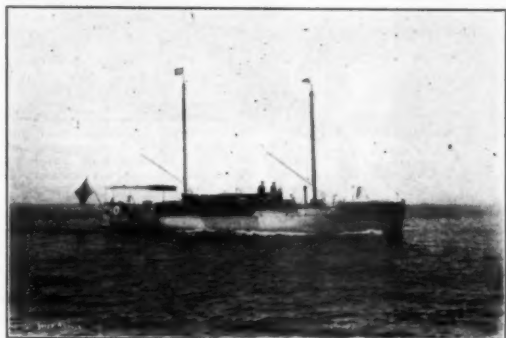
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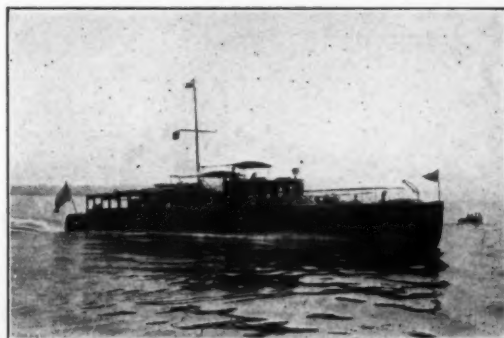
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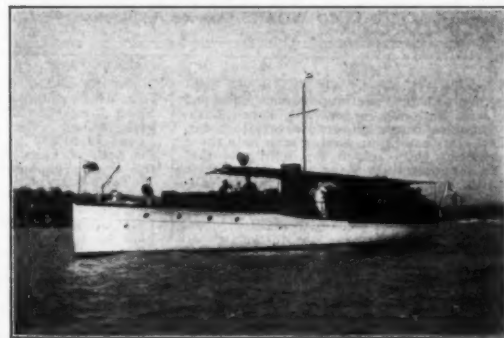
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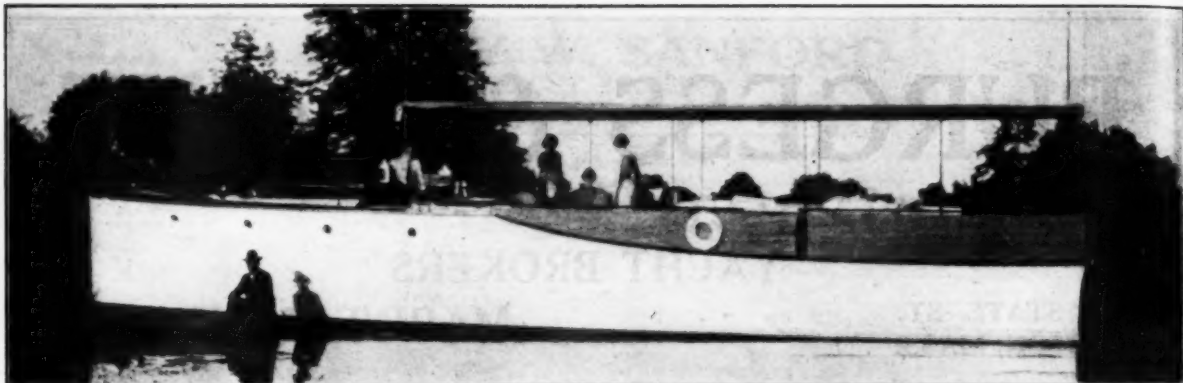


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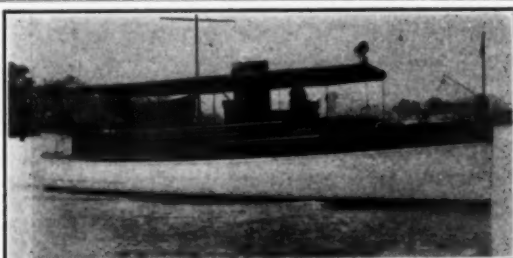


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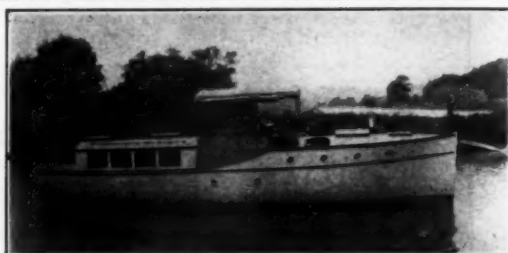
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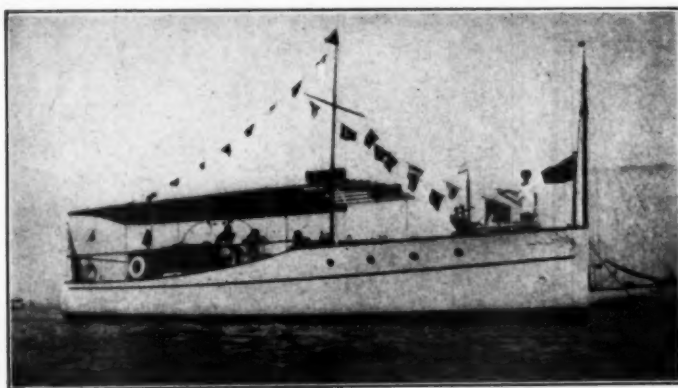
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Thirty-six-foot Burger Standardized Bridge Deck Cruiser, new June, 1921; beam 9 ft., draft 3 ft., six cylinder, 60-80 H.P. Scripps motor, bridge deck control. Two cabins, sleeps six. Galley and toilet room. Attractive offering. Consolidated Shipbuilding Corporation, Morris Heights, New York City.



For Sale—Bridge Deck Speedway Cruiser; 46 ft. L.O.A. 11 ft. beam and 3 ft. 6 in. draft. Built by Consolidated Shipbuilding Corporation. 4 cylinder Speedway Engine, 6 in. bore, 6 in. stroke. Hull, engine and equipment all in good condition. Can be inspected at THE ELCO WORKS, Avenue A, Bayonne, N. J. Price reasonable.

For Sale—Two twenty by six Mullins, air compartment, non-sinkable, steel auto boats. Equipped complete with auto top, brass rails, kapok cushions, nine-twelve horse power Universal motor. Are in first class condition, having seen only three weeks' service. Only reason for selling is that owners do not find them large enough for their requirements and are buying larger boats. Address E. A. Burch, 205 West 3rd St., Oil City, Pa.

Wanted—a retired sea captain to assist in operation of eighty-foot cruising yacht for month or two. Must know Atlantic sea coast. Write fully. Box 209, MoToR BOATING.

TRIMOUNT WHISTLE BLOWER OUTFITS

Blower runs by friction contact with engine fly-wheel. Whistle of brass, nickel-plated.

Made in 3 sizes.
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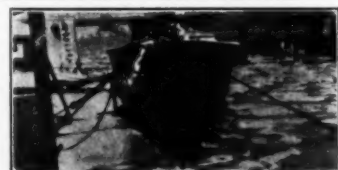
All bronze composition. Suction lift 6 to 20 feet. A lifelong convenience.

Made in 3 sizes.
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L. C. Edelblut, Augusta, Ga.

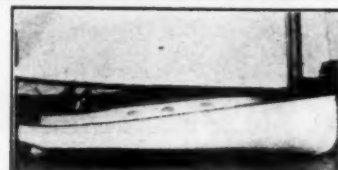
For Sale—The Belle Isle Bear Cat runabout, 26 x 6½, exhibited at the New York Motor Boat Show January, 1921. Cost \$7500. Will sell for cash, \$3500. Perfect condition, good as new. Speed 30 to 35. Seats eight people. Windshields for both cockpits, complete equipment. One of the finest runabouts made. Address Box 207, MoToR BOATING.

Wanted—Am in the market for the following boat equipment for use next fall and will be glad to correspond with any one having it to offer, would also be interested in hearing from manufacturers with prices of new equipment. Two 6 cylinder Speedway—Sterling or Hall-Scott—develop not less than 100 H.P. each. Three Speedway or Kermath 12 H.P.—One Andrade Windlass with 300 ft. ¼ or ¾ galv. chain, state condition. Be explicit and give lowest cash prices. Address "Builder", c/o Motor Boating.

For Sale or Trade—One 3 cyl., 2 cycle, 36 H.P. Gray Marine Motor, with full equipment, ready to run, for anything of equal value. L. C. Edelblut, Augusta, Ga.



For Sale—60 ft. houseboat, equipped with 3 cylinder engine, galley, 2 staterooms, piano room, bath room, marine toilet, hot water heating system. Price \$2200. See steward, Undercliffe Boat Club, Edgewater, New Jersey.

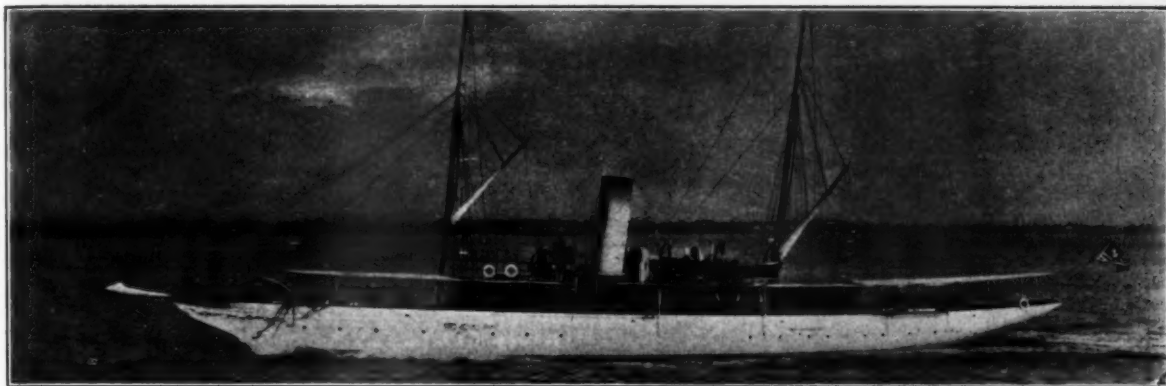


GENUINE "CROSBY" AUXILIARY CATS. Good, used, sound-tight boats, direct from "Crosby" shops. Best available shown here April-May delivery. Rosemond, Fourth St., Greenport, N. Y.



For Sale: Exceptionally High Grade Cabin Cruiser; 33 x 8 x 3. 25-30 H.P. Buffalo Motor, (new last year). Speed 10½ miles. Toilet, ice chest, electric lights, running water, galley, etc. Full head room. Fully equipped, everything of the best. New tender. Laid up at Boston. Box 206, MoToR BOATING.

For Sale—Auxiliary Ketch, 33 ft. x 10 ft. x 3 ft. centre board. Trunk cabin, 2 berths, galley and toilet; 6 H.P. Palmer engine, good condition. Sails new last spring. A very comfortable seaworthy boat. Apply H. H. Hemming, 48 West 73rd St., New York. Col. 4998.



The Bargain Of The Year

HERE is a steam yacht that looks the way a steam yacht should look. Trim, well balanced, she is the handsomest medium sized yacht in the fleet. 160 ft. over all, 123 ft. water line, 20 ft. beam and 8 ft. 6 in. draft.

Built by the Consolidated Shipbuilding Co. from Gardner's design, with steel hull, mahogany deckhouse, launches and fittings all that you expect from these builders.

Seven staterooms including deck stateroom—two have brass beds—two are double rooms. Two owner's baths and deck toilet. Oak dining room, mahogany music room, all furniture and decorations in exquisite taste. Boiler practically new.

Needs no repairs or replacements to put into commission.

Was not in Government service, and has always been kept up regardless of expense. Was recently surveyed by Lloyd's and certificate of condition will be furnished.

With but one boiler, she is far more economical to maintain

than a 100 foot gasoline cruiser, with more speed, comfort and reliability. On long voyages, the sails can be used. She has cruised extensively and proved her sea going qualities.

I have just delivered a shoal draft fishing and hunting yacht to her owner and he wants his Captain and Engineer, who he kept the year around, for the new boat. Hence I have persuaded him to place a figure on this steam yacht so low that the "Buy" will be apparent and unquestioned.

Price is \$35,000 cash.

I will personally superintend fitting out, engage crew and deliver anywhere at cost. Inspectable at New York.

The price asked has no relation to the value offered in this yacht, as actual survey estimates that she is 93% as good as new. She cost around \$150,000, and replacement cost would be far more at present time.

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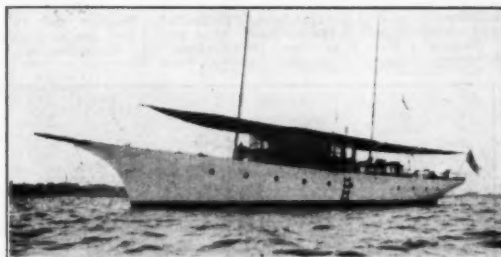
Our stock consisting of almost three hundred new and slightly used motors (more than was displayed at the entire New York Motor Boat Show) embraces all sizes, types and makes. Rebuilt, guaranteed and sold at a price consistent with the times. Let us figure with you on your next power plant.

Advise size and type of your boat and about the size engine you want.

Our bargain list will be sent anywhere on request.

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No. 1862—Unusual opportunity to purchase a seagoing power cruiser, formerly a steam yacht, 83 ft. o. a., 13½ ft. beam, 4½ ft. draft. Designed and built by Herreshoff Mfg. Co. for the late John B. Herreshoff, who in 1916 removed the steam plant and installed a gasoline motor with reduction gear. Very large accommodations, consisting of two double and one single stateroom, large cabin, deck dining room and galley, two owner's toilets and bath, liberal crew's quarters. Yacht is in fine shape in every way and most completely equipped with launch, rowboat, etc. Offered for sale either with or without motor. Most comfortable summer home at bargain price. Apply John G. Alden, 148 State St., Boston.

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| Gray | 4½ | H. P. Model R Complete. |
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| Friskie | 10 | H. P. Two cyl. unit. |
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THE MOTOR BOATING MARKET PLACE

The rate for "For Sale" and "Want" advertisements is 6 cents per word, minimum \$1.50. If an illustration is used, the charge is as follows, which includes the making of the cut:

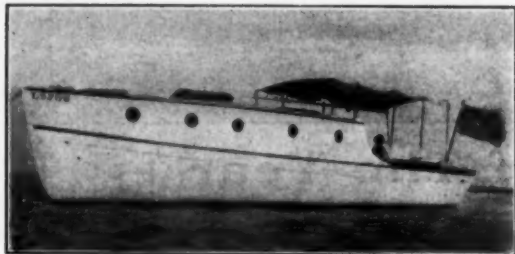
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| Cut 2¼ inches deep, four inches wide..... | \$15 |
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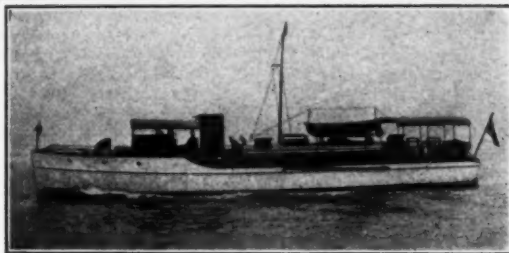
Classified advertisements set entirely in small light face type. No extra charge for capitals. Bold face type used at display rate, \$12 per inch, single column.

Opportunities for the Motor Boatman

Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month. Please mention MoToR BoatinG.



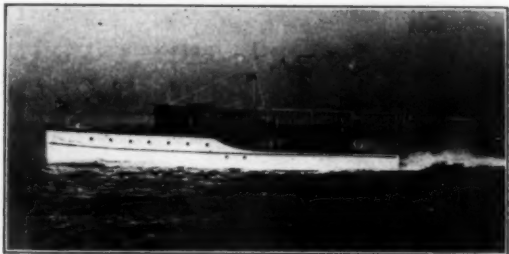
For Sale—Desirable cruiser 30 ft. x 7 ft. 9 in. beam, 2½ draft, heavy duty engine, ready for service. Speed 8 to 10 miles. Toilet, state room, galley with stove, etc. Price reasonable. Address Frank Hewitt, Seaside Park, N. J.



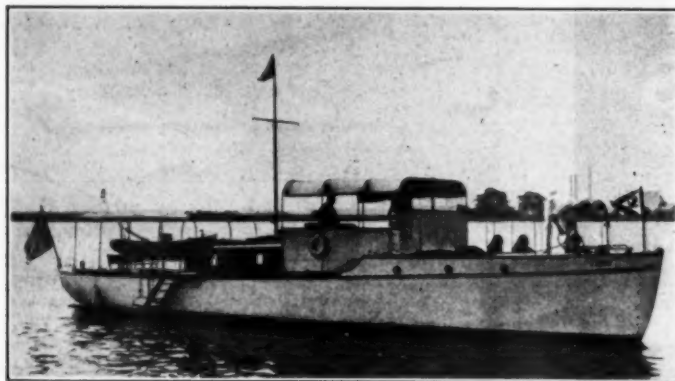
For Sale—Yacht Celeritus, 61 ft. O. L. x 11 ft. 6 in. x 3 ft. 9 in. beam. Designed by Swasey. Built by Jacobs 1916. Redesignated 1919. Motors overhauled 1920. Power plant, two Sterling eight cylinders 150/200 H.P. each. New power dingy built 1920. Perfect order. Complete inventory. Price \$12,000. Apply Oliver, 417 Canal Street, New York.



For Sale—31 x 5 foot runabout. Beautifully finished and fully equipped, developing 22 miles per hour. Cost \$4,300 and can be bought right. Rochester Boat Wks., Inc., 10 Charlotte Sta., Rochester, N. Y.



For Sale—Express cruiser, 57 ft. 9 in. long, 12 ft. beam. Has one large double and two single staterooms, and bath. Also large deck house. Beautifully equipped. Electric lighted. Built especially for Florida waters and long cruises. Speed 15 miles. Address Post Office Box 1081, Detroit, Mich.



No. 1424—For Sale, low figure—Lawley built double planked cruiser, 52.9 x 8.6, six cylinder Buffalo motor; crew's quarters, engine room, galley, large main saloon, toilet, etc. Apply William Gardner & Co., 1 Broadway, New York.

For Sale—A Crosby built auxiliary sloop, 34 ft. long, 29 on water line, 11 ft. beam, 4 ft. depth. All in good condition. Box 208, MoToR BoatinG.

For Sale—"Standard" motor, 2 cylinder 6 x 8 in. No. 340. New bronze shaft, stuffing box, stern bearing, air tank, muffler, whistle, batteries, piping, fittings, etc., also second hand propeller. Engine has been thoroughly overhauled. Price \$450.00. Also a new Koban motor with magneto. Price \$85.00. F. S. Nock, East Greenwich, R. I.

FLOAT FOR SALE
One large pontoon float, 20 ft. x 25 ft. free board 14 in., strongly built, perfect condition; for sale reasonable. Christiansen, 15 William St., New York.

Wanted—Cabin cruiser to accommodate four. Give dimensions, equipment, draft, speed, power, price, etc., W. B. Forman, Canajoharie, New York.

For Sale or Charter—New 50 ft. cabin cruiser, fully equipped. Price, \$9,000. G. A. Roland, 14 Bittman St., Maspeth, L. I., N. Y.

For Sale—Runabout, 28 x 5 ft. 4 in., powered with D-6, six cyl. 75 H.P. Scripps, completely and beautifully equipped in every way. Speed 23 miles. Runabout champion 1920 M. V. P. B. A. Regatta. Price \$1750, or best offer. Photographs and details to interested parties. Evan F. Morris, Quincy, Ill.

Wanted: Heavy duty 75 H.P. 4 cylinder 4 cycle marine engine with heavy duty clutch. Box 205, MoToR BoatinG.

For Sale—Passenger gas boat 64 x 13½ x 4 ft., flush deck, engine below deck, seating capacity 150 people, speed 9 miles. Boat is fully equipped and good condition. Must be sold, no reasonable offer refused. For further information inquire of C. H. Morrison, Dexter, N. Y.

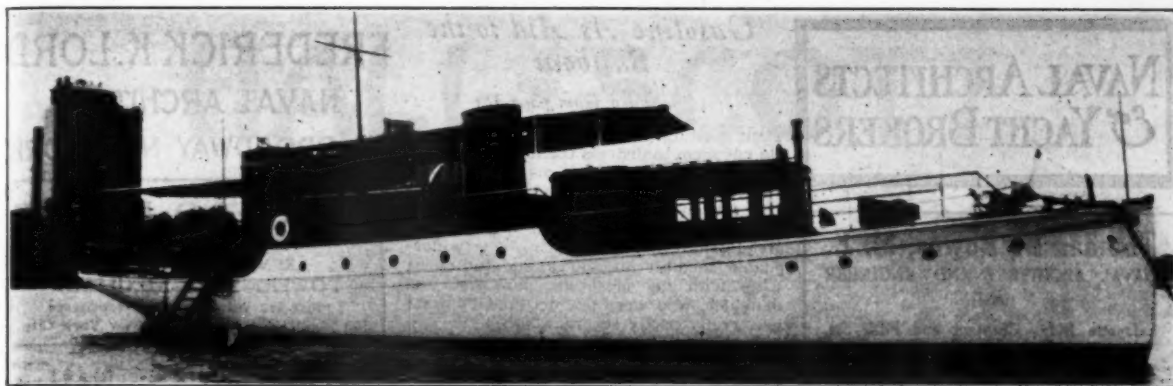


For Sale—154 passenger and freight boat 56 ft. x 16 ft. x 3 ft. 3 in., 10-12 knots, built 1917 of 2 in. planking. Tanked for outside waterways. Two 30-40 H.P. Vulcan 4 cyl. each. First class condition throughout. Cost \$14,000 to build. Will consider reasonable offer. Capt. Bender, 919 Lombard St., Wilmington, Del., Phne. Wil. 3742.

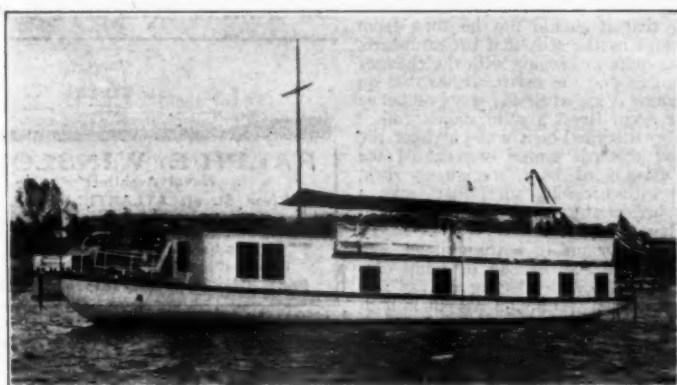


Rochester type cruiser, 38 ft. fine condition. See Feb. advertisement for description. Asked too much for quick sale. Take \$600. less. Snap for somebody. Must sell April 20th. C. S. Sickler, 6037 Chestnut St., Phila., Pa.

Paint manufacturer doing national business with large modern plant, New York Harbor, desires establish marine department affording splendid opportunity to right man to develop. Will be handled on strictly commission basis. For period of years opportunity will be given right man for big earnings based on results. Especially liberal commission during first twelve months. Opportunity will be afforded later for taking on additional men under him. Address Breinig Bros., Inc., Hoboken, N. J.



For Sale—At a low figure. Exceptionally well built and seaworthy cruiser. 78 ft. x 15 ft. x 5 ft. draft. Lawley built. Equipped with 125 H.P. Winton engine. Engineer room amidships separated by two steel water-tight bulkheads. Owner's quarters aft. Very commodious deck dining saloon. Has hot-water heating system. Accommodate 7 in owner's quarters. Excellent condition. Further particulars from Henry C. Grebe & Co., Inc., 6 N. Michigan Ave., Chicago, Ill.



For Sale—The Commodious Houseboat "Roamer", 71 x 22 ft. (fully furnished). Salon 18 x 18 ft., bedroom 18 x 8 ft., 2 double staterooms 10 x 10 ft., 2 single staterooms, sleeping accommodations for 10 persons, galley 12 x 18 ft., 2 toilets, bathroom, fresh and salt water tanks, two 20 H.P. Racalco engines, twin screw, General Electric dynamo. Boat can be seen at Gage Shipyard, Nyack. Wm. J. Kennedy, 41 Park Row, N. Y.

For Sale—100 H.P. high speed motor with two magnetos, spark plugs, carburetor, \$375. Excellent condition. M. D. Cooke, 333 Fulton St., Hampton, Va.

Position wanted by licensed Chief Engineer of 300 gross tons for gas, oil, naphtha and Electric motors, also an auto mechanic and a handy man with carpenter tools. Would consider a steady position with some good party. Reference furnished upon request. Emil E. Stienback, Rudyard, Michigan.

2 H.P. Evinrude outboard motor, run 50 miles, new. Special outboard motor boat 14 x 5 new last season, newly painted. Reason for selling getting larger boat. Price complete \$160.00. Donald S. Garde, Cromwell, Conn.

For Sale—Bridge Deck Cruiser 40 ft. x 10 ft., fully equipped, self starter, electric generator, seaworthy—bargain. Wm. Bowman, 317 Winalow Ave., Buffalo, N. Y.

A few pair of very powerful and clear Bausch & Lomb Prism Binoculars, 6 x 30 power, complete with case, etc. Worth \$75.00, will take \$40.00. Percy M. Child, 1110 14th St., N. W., Washington, D. C.

One 70 volt, 75 amp. direct connected Winton four cylinder generating plant, worth \$1250.00, will take \$500.00. One 110 volt, 39 amp. direct connected Winton four cylinder generating plant, worth \$1250.00, will take \$600.00. One 110 volt, 15 amp. direct connected one cylinder Carlisle & Finch generating plant, worth \$350.00, will take \$175.00. One 18 in. Rushmore search lamp, 35 amp, deck type, will take \$125.00. One set large galv. running lamps, both oil and electric, suitable for vessel up to 100 ft., complete four lamps, \$20.00. Let me quote you on marine search lamps, all sizes. Percy M. Child, 1110 14th St., N. W., Washington, D. C.

For Rent—Complete boat works and machine shop for sixty footers or under. Exceptional location near New York. Privilege of purchasing. Best location in America. Paine, 756 Broad St., Newark, N. J.

FREE Illustrated Literature. Outboards, New and Rebuilt Engines. Universal Joints, Pumps, Clutches, Gears, Hyde's, Gordon Reversible Propellers, etc. Canadian Boat & Engine Exchange, Toronto.

Portable Phonographs—Specially made for Motor Boating and outdoor use. Easily carried about. Dimensions when closed 1 ft. x 1 ft. 6 in. Plays all records full tone. We send C.O.D. Postpaid. Further information write to Long Island Piano Exchange, 796 2nd Ave., Astoria, L. I.

Have your boat engine perfectly over-hauled or rebuilt; installed with a guarantee. Rebuilt engines for sale. Dolland, 236 W. 137th St., New York City.

Engines—New and rebuilt, four to forty horsepower, for sale at reasonable prices. Brown-Talbot Machinery Co., Salem, Mass.

| One cyl., two cycle | |
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| 2 H.P. Perfection | \$30 |
| 3 1/2 H.P. Gray | 45 |
| 6 H.P. Caille | 65 |
| 8 H.P. Fairbanks | 85 |
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| 6 H.P. Gray | 55 |
| 6-8 H.P. Gray U. | 95 |
| 8 H.P. Racine | 65 |
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| Four cycle | |
| 2 H.P. Dunn 1 cyl. | 35 |
| 4 H.P. Dunn 2 cyl. | 55 |
| 8 H.P. Dunn 2 cyl. | 85 |
| 12 H.P. Lamb 2 cyl. | 135 |
| 12 H.P. Doman 3 cyl. | 145 |
| 16 H.P. Dunn 4 cyl. | 165 |
| 20 H.P. new Erd 4 cyl. | 225 |
| 24 H.P. Dunn 6 cyl. | 185 |
| 30 H.P. new Doman 4 cyl 5 x 6 | 265 |
| 30 H.P. Automatic 4 cyl. 5 x 7 | 285 |
| 30-40 H.P. Red Wing unit plant. | 565 |

BADGER MOTOR CO., Milwaukee, Wis.



No. 1586—For sale at low price. Day cruiser 45 ft. x 9 ft. 6 in. x 3 ft. 6 in. Bridge deck, large cockpit aft; engine in house amidships. Toilet room, galley, two berths forward. 40 H.P. Murray & Tregurtha engine. Apply John G. Alden, 148 State St., Boston.



For Sale—35-ft. Day Cruiser, 34 H.P. Knox motor, 2 cyl., 4 cycle with reverse gear, Atwater-Kent ignition. Boat light draft and in good condition with tender. Price \$1,500. E. Y. McCurdy, 133 S. 12th St., Philadelphia, Pa.

For Sale—12 H.P. 2 cyl. 2 cycle medium duty Racalco Marine motor; 5 in. bore, 6 in. stroke. This motor will deliver 16 H.P. at 750 R.P.M., and drive a heavy built cruiser or work boat with good lines 12 to 14 M.P.H. Thoroughly rebuilt, compression perfect. Water pump, air pump, timer and carburetor. Price \$150. Rainbow Lumbar Co., Cheboygan, Mich.

Practically new 3 cylinder, 4 x 4 1/2 Kahlenberg marine engine complete, with rear starter, magneto coils, etc., bronze wheel and force feed oiler. Just right for good sized cabin or work boat. First check for \$250.00, plus transportation and crating takes it. C. M. Murray, 1306 Edanola, Lakewood, Ohio.

Wanted—Bargain in about 35-foot auxiliary or good sailing vessel readily convertible. Ordinary repairs not objectionable but must be essentially sound. Full and correct details required. Photos returned immediately. Address Houseboat "Wigwam", foot 213th St. and Harlem River, N. Y. C.

For Sale—Leece-Neville twenty-four volt single unit electric starting and lighting generator. This generator has been rebuilt at factory and never used since its return, so is in perfect order. Price \$35.00. Address R. T. Gallagher, Washington, North Carolina.

For Sale—Scripps D-6 motor. 6 cylinder 60-75 H.P. Used ten days running generator during coal shortage. Price \$1300.00 F.O.B. Detroit. Ockford Printing Co., 608 Howard St., Detroit, Mich.

WANTED—motor boat about 25 feet trunk cabin preferred. Would prefer boat located vicinity Chesapeake Bay. Address stating full particulars, price, send photograph to BROWN, Room 817, 25 Broad St., N. Y.

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Gasoline As Aid to the Sailboat

(Continued from page 42)

stant wetting the engine was subject to do not seem to distress the make and break igniting system which claims superiority to the jump spark for marine purposes.

It was only the yawl-boat that made possible a tea party on board the schooner at Falmouth, the guests being a very hospitable member of the Falmouth Yacht Club with his most intrepid wife and daughter, who were not deterred by what was really pretty severe weather.

Putting in at Brest, our anchorage in the commercial port was sufficiently near the quays to leave the yawl-boat undisturbed on deck. The dinghy was found to fill all requirements. Brest would seem to retain a favorable souvenir of the American occupation, for all the port authorities we had to deal with were helpful and obliging.

In the crossing of the Bay of Biscay our only thought of the yawl-boat was anxiety that it should not be torn from its lashings by the seas that broke aboard.

It was quite in keeping with the changes and chances that the sea furnishes that on approaching Vigo after five days of heavy weather from Brest a calm should fall.

And so the yawl-boat was put over the side and towards sunset we passed the Cofby Islands of bare precipitous rock, fringed with breaking surf, that make a natural breakwater across the entrance to Vigo Bay.

And so we came to a tranquil anchorage in Cangas Bay instead of lying outside in a swell with slatting canvas and swinging booms. Although we put in both at Cadiz and Tangier, the yawl-boat's services were not called upon again until arrival at Gibraltar. Here the wind failed at sunset while we were yet four miles off the Rock. On this occasion the yawl-boat was lashed alongside whilst towing. A steam tug coming out from Gibraltar approached us from the opposite side and appeared rather surprised as well as disappointed that we declined the proposal to take a tow. They were further surprised when the little motor boat and its business was revealed to them. Considering the gasoline boat from the sailing yachtsman's point of view, a little power boat of this sort deserves to be considered with all respect. The sailing man can take all the advantage of gasoline without losing his self-respect when the wind refuses assistance.

A New Diesel Type Engine

The Hadfield-Penfield Steel Company of Bucyrus, Ohio, have issued a catalogue describing their Diesel type horizontal and vertical standard fuel oil engines. These engines are built on the two-cycle principle with a cross head which also serves as a pumping piston for furnishing air to clean out and fill the main working cylinder.

The Vertical Engine is built in two-cylinder sizes—50 and 125 b.h.p. per cylinder and in 2 to 6-cylinder units.

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Changes in Essington Yard

The president of the Yacht Repair and Storage Company, Essington, Pa., Henry Reeves, has resigned and George A. Smith, Jr., has been elected in his stead. Paul R. Gibson similarly has been elected vice-president and treasurer, while Charles B. Downs becomes secretary. In charge of the boat building and repairing department will be found William H. Beebe of long experience at this work and patrons are assured of careful attention to all their requirements.

The Harvey Two-Cycle Motors

Several years ago an excellent two-cycle motor was manufactured in Rochester by the Leary Gasoline Engine Company. Owing to war conditions the manufacture was discontinued and will now be resumed by the Harvey Marine Motor Company. The motor will be the same as was formerly built and known as the Leary and is of the two-cycle type made in one to six cylinder units all with the same bore and stroke, that is $3\frac{3}{4}$ by 4 inches. These motors are built on the two-cycle three port principle and designed particularly for marine motors. The port arrangement is such that extra passages are built in for high speed running and extra power.



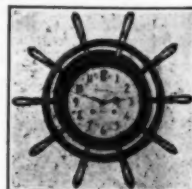
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We specialize in striking and non-striking ship's clocks, chronometers, barometers, etc., and in repairing high grade ship's clocks. Our clocks make splendid Yacht Club prizes.

Unexcelled in accuracy, reliability, workmanship or finish. Clock manufacturers for ninety years.

Write for prices.

Daniel Pratt's Son (Winthrop E. Pratt), 294 Washington St., Boston, Mass.
Established 1832

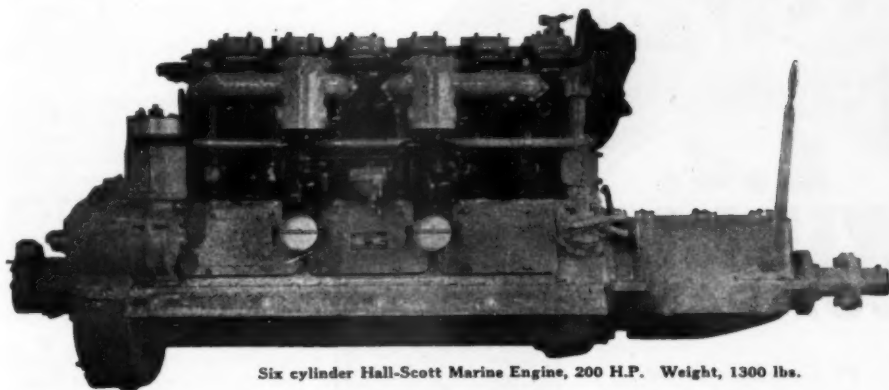


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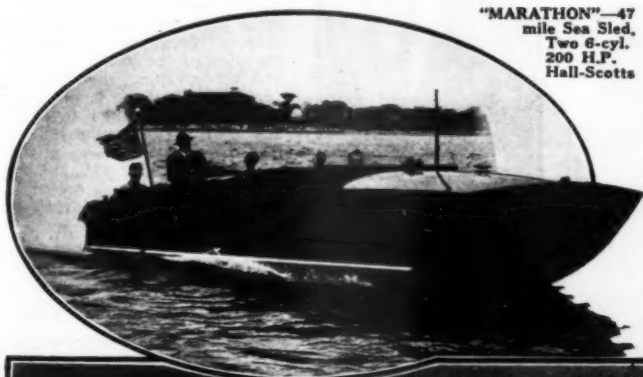
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Six cylinder Hall-Scott Marine Engine, 200 H.P. Weight, 1300 lbs.

Hall-Scott Marine Engines have established entirely new standards of reliability for fast turning motors. Annoyances, repairs and breakages, formerly tolerated as unavoidable in high speed work, have been proven both avoidable and unnecessary. Better design, better materials, better workmanship, have produced lighter engines, faster engines, greater dependability and better economy.

Hall-Scott owners have learned to demand high speeds and full loads continuously. Furthermore they have learned that their motors do not require constant attention or even annual overhauling. Hall-Scott engines are used unsparingly because they are so dependable.

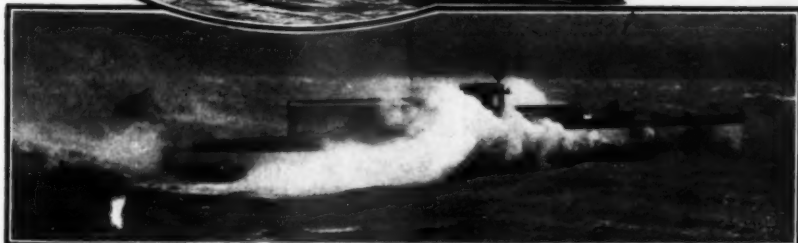


"MARATHON"—47
mile Sea Sled.
Two 6-cyl.
200 H.P.
Hall-Scotts

Hall-Scott powered boats have demonstrated conclusively that light weight does not affect the reliability of a properly built motor,—that 20 to 48 miles per hour for runabouts, and 15 to 35 miles per hour for cruisers, are practicable passenger-carrying speeds for motor boats, not merely spectacular racing records. Given oil and gas these engines will run indefinitely.

Write for descriptive literature.

4 cyl., 125 H.P., 1100 lbs.
6 cyl., 200 H.P., 1300 lbs.



"AJAX"—25-mile Ferry Boat, 40' x 7'6",
6 cyl. 200 H.P. Hall-Scott

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of motor boat equipment, with
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Removing Paint and Varnish from Hulls, Decks, Cabins, Spars, Etc.

By Joseph Kempf

Secretary, Chalmers Chemical Company

THE removal of old paint and varnish preparatory to refinishing has always been regarded as one of the most messy and disagreeable jobs incident to the outfitting season. Modern removing compounds, coupled with up-to-date methods, however, have robbed this job of most of its old-time terrors. There are three methods that, at one time or another, have been considered the best practice for removing old paint and varnish coatings from hull and superstructure of boats.

First: Dry-scraping—This is the most primitive method and the most wasteful of time, temper and energy. It was originally the only method known to the layman, but is now obsolete. It called for a vast ex-

penditure of elbow grease and involved the use of a sharp-edged scraper with the consequent danger of gouging the wood. There is nothing that can be said in favor of this process.

Second: The burning-off process—Involving the use of gasoline torch. This method, while not so good for decks, cabins or spars, gives satisfactory results on painted hulls, provided the torch is manipulated by an expert. In the hands of a novice the gasoline torch is a menace to himself and his surroundings, as well as to the article to which he is attempting to apply the flame. For metal hulls the application of the gasoline flame is entirely impractical, as the heat expands the metal.

This method, therefore, because of its hazard, is little used by the layman or the practical painter, and should be left to those who will know where it can be used to advantage.

Third: The paint and varnish remover (marine) process—This may be termed the up-to-date process. It is employed by all progressive ship-yards who strip and refinish on a large scale. It performs the task with even greater ease and efficiency than the gasoline torch, without its hazard or requirement as to skill and practice. It requires only a fraction of the time and labor of Dry-scraping, with less danger of scratching or marring the wood.

There are a few important points to be observed in the use of paint and varnish removers to insure a perfect job. Experience has demonstrated the following to be the proper procedure:—

First:—The surface to be stripped should be placed within easy reaching distance. If exposed to bright sunshine or high wind, protect from both as much as possible.

Apply a heavy coat of marine remover flowed (not brushed out) over the entire surface to be removed. Allow to stand for fifteen minutes to an hour or longer if necessary, depending on the number of coats of paint or varnish to be removed. Then if a great many coats of paint or varnish are to be removed, before attempting to scrape, apply another coat of remover on top of the first coat, sopping it on, being careful not to brush it out. The work will then be in a shape to scrape, using a 2½ or 3 inch scraping knife, taking care not to gouge the wood with the edge of the knife.

After scraping the entire surface, it is well to apply another light coat of remover to clean off any small particles of paint or varnish that may have been missed by the scraping knife. Washing with alcohol or gasoline is optional.

One of the most fruitful causes for unsatisfactory results in the use of remover is the very common and improper practice of over-brushing. This fault is very often responsible for unjust complaints that the remover is inefficient. Over-brushing breaks the protective film and allows the volatile solvents to escape into the air and waste themselves.

Remover must be applied with the least number of strokes of the brush possible, brushing in one direction only, the upward stroke or across; either is better than the downward stroke. Start with a full brush, flow on freely, as much as the surface will hold without dripping, being careful to cover all the surface. Use a good brush, a new one is best. Don't use an old stub. This is important. A new full-haired brush means a good brush full of remover. Don't use a rubber-set brush.

A hard wind or hot sun will increase evaporation of the solvents contained in the remover and lower its efficiency. For this reason, the stripping job should be done on a cloudy day, if possible, when there is little sun or wind. The leading manufacturers now make a special brand of remover, called Marine, designed to meet the unusually severe atmospheric conditions of the ship-yard or other water-edge refinishing work.

A Place to Go

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MIAMI BEACH

During the Wood-Fisher Races at Miami Beach, March, 1922. The Flamingo Hotel in the background.

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Touched by the Gulf Stream, Miami is as balmy as a Northern June throughout the year. In summer months it is more temperate than New York and other Northern cities. All outdoor recreations can be enjoyed at every season.

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What Shall We Do This Spring?

(Continued from page 11)

enlarged, some form of leak proof or over-size ring may be used to good advantage.

In order to overcome the handicap imposed on the engine by the low grades of gasoline commonly distributed by the dealers of today, it would seem advisable to install a form of hot air intake so as to vaporize this fuel more effectively. All new machines are being fitted with devices of this kind and many old machines would be greatly benefited by its use. It consists essentially of a duct leading from an uncooled portion of the exhaust pipe to the carburetor intake which will feed heated air in such quantities as may be found desirable. It might also be advisable to fit some form of device to reduce starting difficulties. Many motors particularly in the larger sizes are obstinate when it comes to starting on a cold damp day. Several new devices have recently appeared which claim to make this difficulty negligible and will ease the starting of the most obstinate machine.

Perhaps the most essential thing to do on the motor is the grinding of the intake and exhaust valves. While the motor is in service the valves are kept in good condition by their continual pounding on the seats. Once the motor is inactive for a few months moisture will gather on the polished faces and rust will form. Such pitting as was present will be enlarged and all valves should be reground and finished while the motor is laid up. This can be best done by removing the valve springs and applying a coating of valve grinding compound to their surfaces. They should be rotated on their seats by means of a large screw driver or brace in such a way that the turning is not continuous. A short turning motion back and forth gradually working completely around the valve is the best and avoids scoring the seats with the abrasive. A finishing touch should be given with fine compound later and the seats and valve faces left in a perfectly smooth condition. When the valves are re-assembled they should be liberally coated with oil to avoid any possibility of corroding again before the motor is used. A word of caution may not be out of place at this time. When using valve grinding abrasives be careful not to cut too much. These materials are very sharp and will remove material rapidly. Another point to watch is that all openings to the cylinder and otherwise are closed with rags during the grinding operation. Valve tappets should be free and the adjustment of the gap clearance given careful attention. When the motor is cold the clearance should be slightly greater than if the adjustment is made with the motor hot. When using wiping cloths be sure to select material which will not unravel and leave ends of lint in stray corners of the engine. Nothing will clog up the oil ducts more rapidly than this, and an obstructed oil passage will mean a ruined bearing.

One of the handiest tools which has practical application on a motor boat is a tire pump. In cases of obstructed water jackets, oil tubes, or other similar passages, the pressure which the automobile tire pump is able to exert will clear any ordinary obstructions very effectively.

It frequently happens that changes in the electric wiring of the lighting fixtures or ignition apparatus is desirable. This can be undertaken with profit before the painting is completed. One important consideration is the location of the storage battery with relation to the starting motor. Some boat builders do not seem to realize the difficulties caused by placing the battery at great distances from the motor. The drop in voltage is very large in such cases and the operating efficiency of the machine is reduced tremendously. The leads from the battery to the starting motor should be as short as is physically possible. The switch should also be close by and if necessary a mechanical operating device should be installed rather than to extend the cables to a remote switch. For some starting services operating on six and twelve volts a newly perfected remote control switch offers many advantages. The principle of this is to operate the main starting switch by means of a solenoid operated from a remote point by means of a small current. This closes contacts at the main switch, allowing the heavy starting currents to flow through the circuit and starting motor. It has the decided advantage of permitting its location in any desired point.

By far the best job, as far as work goes is that of repainting the hull. This is one task which must be done not alone each spring but probably once again during the summer. On a new hull or one in which the old paint is in good condition it will merely be necessary to wash it down thoroughly and apply two to three coats of new paint in the desired color. On an older hull which has been painted repeatedly for a number of years it may be advisable to remove all old paint. The simplest process for doing this is to use the gasoline torch and burn down the hull. This operation while simple is one which requires strict attention to business. The burning torch has a very intense flame and must be carefully directed and kept in motion. It is held so that the flame touches the paint and imme-

(Continued on page 68)



Speed without Vibration

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**Featherweight Pistons
now available for
Motor Boat Engines**

Builders and owners of motor boats will be glad to know they can now secure pistons of "DOWMETAL" which made such astonishing records in 1921

"DOWMETAL" Pistons reduce vibration to a minimum.

"DOWMETAL" is much stronger than any other metal used for pistons.

It is much tougher than any piston metal.

It is the lightest of all commercial metals.

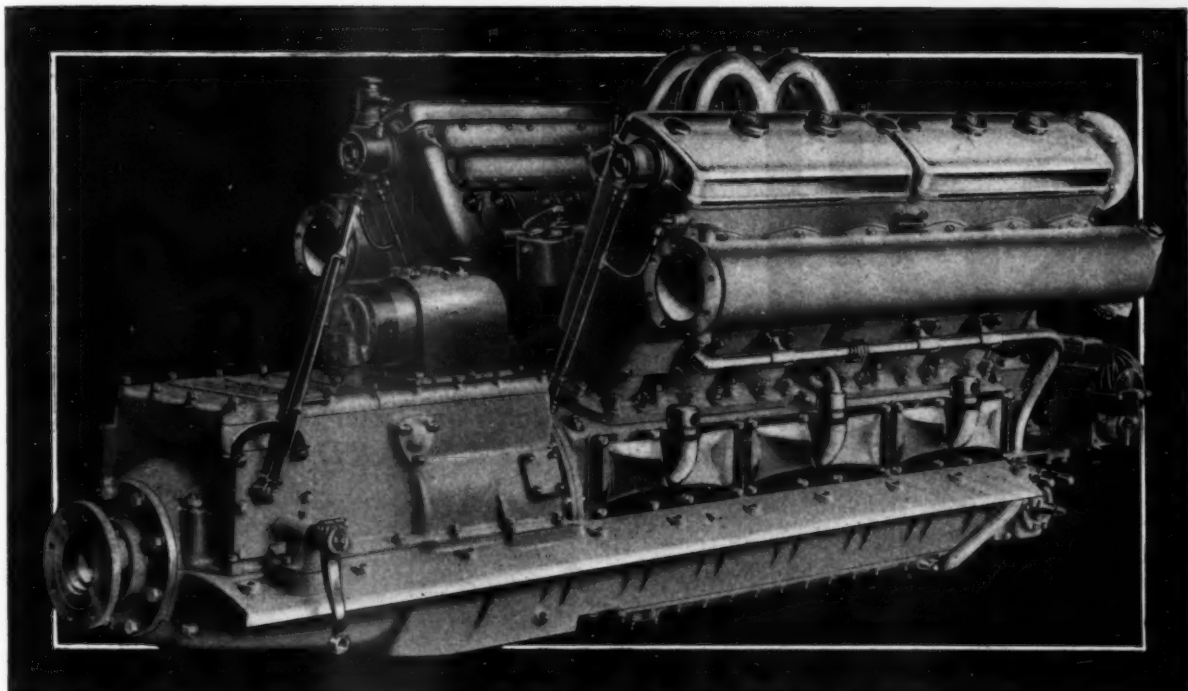
It multiplies speed—was the winner in the 500-mile Indianapolis race and has a coast-to-coast record for 1922 victories.

The owners of "Baby Sure Cure" say about "DOWMETAL" Pistons: "They not only increased the R. P. M. but proved very satisfactory in every way. It started much easier than with the standard pistons and idled down to what the fisherman would call 'trolling speed.' I am very hearty in my praise of these pistons."

See what this sturdy, non-scoring piston will do for your boat. Observe how its lightness removes vibration, adds power, and improves engine performance. Write for illustrated folder.

Pistons made special for any high grade engine.

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THE Allison is the only marine motor that does not show in its design or construction the influence of competitive prices or considerations of cost which compromise quality.

For that reason the Allison is the only marine motor suitable for the yacht of the man who can afford the best.

Its price of \$25,000 cannot fairly be compared with the prices of ordinary gasoline engines because there is no basis of comparison in construction or service. To say that it is in a class by itself is trite but true.

This motor is the production of one of the best equipped automotive manufacturing plants ever organized. Three years of conscientious effort by a staff of engineering experts carried out each detail to the point of perfection before the motor was announced.

Every expectation of efficiency, reliability and economy has been realized. Performances of the Allison have already rewarded the care taken in its production.

Let us send detailed specifications



Twelve cylinder, Vee type
400 H. P. at 1400 R. P. M.
Bore $5\frac{1}{2}$ " Stroke $7\frac{1}{2}$ "
Weight 4400 pounds.

The forked type connecting rods are drop forged from chrome nickel steel, machined all over. In fact, all working parts of the Allison are machined over the entire surfaces and balanced with absolute precision. Special light pistons are used, with four piston rings, drilled oil return groove and floating piston pins which can never slip and score the cylinder.

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Clutch - or Better, Trade It In For a
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THE new 1922 Standard Reverse Gear with the Multi-cone Clutch has made such a tremendous hit that we are receiving repeated requests from boat owners to install the new clutch in their old gears, or to accept the old gears in trade for a brand new Standard.

Either way, you can't afford to go through another season with a troublesome old clutch. Prices are



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The case is absolutely oil tight and the mechanism inside not only embodies the best of materials and workmanship, but also is more advanced in design than any other gear on the market.

Old Gear

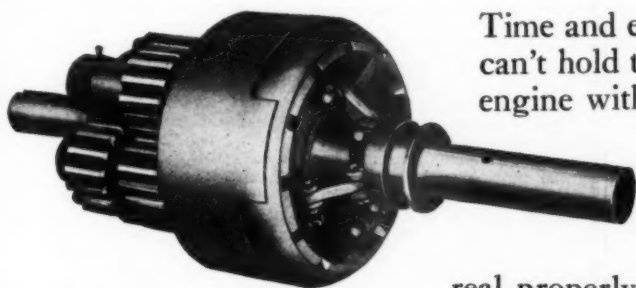
Tear Out-Mail Today

Here are the details of my boat, engine and reverse gear. Please quote price on a new gear.

Length Beam Type.....
 Engine Model.....
 H. P. R. P. M.
 No. Cylinders Bore Stroke
 Dia. Crankshaft Dia. Propeller Shaft.....
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 Address

ANY good factory can cut gears but no other can build as good a clutch as the Standard Multi-cone Clutch.

"It wears in, not out."



Note the compactness of this clutch. The toggle mechanism is out of the way, inside the cones, while the friction surfaces of the clutch are at the most effective point, —the point of greatest diameter.

This is the easiest clutch to adjust. It is the easiest to take apart and assemble.

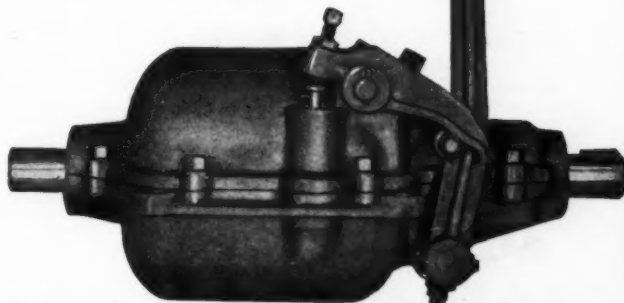
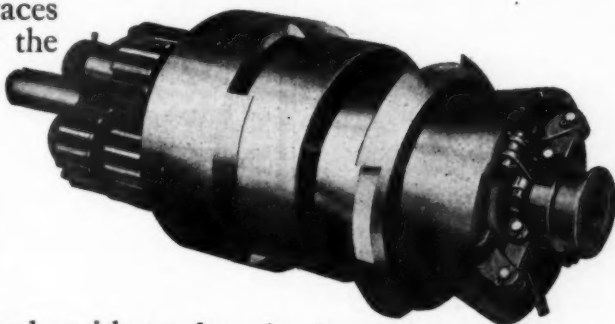
It disengages completely without drag in the neutral position, and takes hold as smooth as a steam engine. The cones cannot buckle, warp, stretch, or drag, as discs do when great pressure is applied.

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Standard Gear Company
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Time and experience have demonstrated that you can't hold the continuous heavy load of a marine engine with an automobile type of clutch. Big power and constant loads require great friction surface and holding power.

Our new Multi-cone is the first real properly designed marine clutch ever offered. It is light and compact and has several times the holding power of any other clutch of similar size and weight.



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This Columbia "Hot Shot" Ignition Battery has no machine parts to keep tinkering with or to call for expensive replacement

It's a safe bet that after you have begun the use of Columbia "Hot Shot" ignition and lighting current on your motor boat, you will never again attempt a substitute for it.

The Columbia "Hot Shot" Dry Battery is a single solid package that costs little, lasts long, and is obtainable everywhere when you finally need a new one.

The Columbia "Hot Shot" Ignition Battery yields its full power at starting—when your engine needs it most

Columbia Dry Batteries for all purposes are for sale at marine supply houses; electrical, hardware, and auto accessory shops; garages; general stores.

Insist Upon Columbia

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LONG ISLAND CITY, N. Y.

ATLANTA CLEVELAND CHICAGO
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**Columbia
Dry Batteries**
—they last longer

What Shall We Do This Spring?

(Continued from page 64)

diately it begins to blister the torch is moved slowly and a putty knife held in the other hand follows the flame and scrapes the old paint down in the same motion. It will occasionally happen that a spot will not come away clear the first time over and it will require a second going over. Care must be exercised at this time so that the torch will not char the bare wood adjoining the paint. Absent minded operators sometimes will watch the knife and forget the torch in the other hand. The results are not pleasant as a hole will quickly be burned into the wood as the result of carelessness with the torch.

A liberal use of sand paper on the hull follows the burning. It should be well cleaned down and smoothed as carefully as possible. A priming coat of thin paint is then applied and given ample time to dry thoroughly. The next operation is an unpleasant one and is the closing up of all seams and small holes in the planking. White lead, putty, or some of the prepared seam compounds are excellent for this purpose. A mixture composed of dry white lead and varnish is also good material for this purpose and will dry thoroughly hard. It should be smoothed down with sand paper before it sets. The succeeding coats of paint can then follow each other in turn allowing the usual time for drying. The final coat which will be the fourth in all good work should be laid on carefully with good material. Some even prefer to use enamels for the finish coat and these give very fine results. One essential to the application of enamels and varnishes is warm weather and these materials should never be applied on cold or damp days.

The bottom of the hull also requires careful attention. Seams which are open or need recaulking should be repaired and the same putty compound used as on the top sides. At least two coats and preferably three of a good brand of protective copper bottom paint should be used. The character of the waters in which the boat is customarily moored will determine to a large extent which brand of paint is the best. In some localities, paints which enjoy a wonderful reputation elsewhere will prove absolutely useless. While others which may be considered of no use at all in some places will prove excellent elsewhere. In matters of this kind it is best to observe those brands of paints which stand up best in the particular locality. Some manufacturers of this type of paint also recommend that the final coat of bottom paint be applied just prior to the launching of the boat. The claim being essential oils which contain the obnoxious substances for worm protection will not evaporate under water and render the paints more protective.

Interior work on the cabin can just as well be done during the early spring as later when time is more pressing. In the average well kept boat it is hardly necessary to repaint the interior completely each year. The wear and tear on interior paint is very slight and only such parts as the galley, lockers, and lavatory spaces may need refinishing. The processes in the main are identical with the exterior work and ample time should be given for drying. It has been observed that boats which are painted on the interior while they still remain covered do not dry properly. The lack of air circulation under the canvas is directly responsible for this condition and can be remedied only by removing the canvas cover and allowing the free circulation of large volumes of air.

Refinishing bright work is one of the difficult tasks of spring overhauling. In order to do this properly much experience and many operations are necessary. Should the existing varnish surface be unbroken and only slightly weathered it may not be necessary to remove it completely. In other cases it may be advisable to clean the work right down to the bare wood. Should this be done, a good brand of varnish remover should be freely applied, allowing ample time for it to take effect. Another coat of remover can then be applied, and when this has softened the varnish to the bottom of the various coats, it may be removed with a dull putty knife. If the old surface does not come off entirely the first time, it may be necessary to repeat the application. Do not be economical with remover, as it is lots cheaper than the time necessary by other methods. After the wood has been entirely cleaned it should be well washed with gasoline, using a brush to remove every trace of the varnish remover. The preparation of the wood for the new coat of finish will be completed after it has been well rubbed down with fine sandpaper or steel wool. For old work which is not entirely cleaned down, it is merely necessary to rub down the surface with steel wool and then apply a thin coat of good marine varnish. Allow this to dry for three or four days and then rub down lightly with a very fine steel wool in order to kill the gloss. Another coat of the same varnish should then be applied, making it slightly heavier. At times when the weather is cold, varnish may show a tendency to crawl or run off the surface. This may be prevented by washing the undercoating down with clean cold water and applying the finishing coat over the wet surface. This will usually prove effective and will not injure the varnish.

(Continued on page 126)

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All the underwater metal parts of your boat which are subjected to the corrosive action of salt water should be made of genuine Tobin Bronze. No other material is so satisfactory for such parts as propeller shafts, struts and steady bearings, propellers, rudders, rudder stocks, hull plates, centerboards, fin keels, fastenings, etc.

Resistance to corrosion and tendency not to foul are characteristic of Tobin Bronze. Its remarkable tensile strength, high elastic limit, toughness and uniformity of texture make it especially adaptable for marine engineering purposes where strong, reliable material is required.

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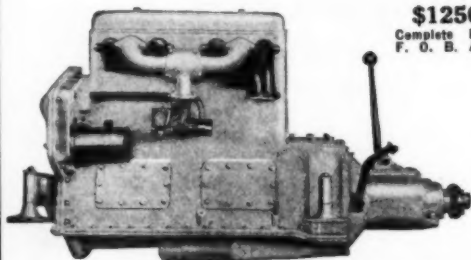
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Mr. Nathaniel G. Herreshoff arriving at Miami, Florida, writes us as follows:—

"I want to say that the J. V. B. engine has not given the slightest trouble since we left home, and is ready to turn around and go back the 1550 miles tomorrow."

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Random Thoughts On Sailing

(Continued from page 19)

It may be said for the schooner that her sail area is reduced in proportion to the yawl's spread of canvas when double reefs are taken in both sails. Nevertheless, it takes time to reef sails, and time in small quantities is often of vital importance. Perhaps it will be thought from my constant reference to them, that I have squalls on the brain. My preference for boats which handle easily is not based on a fear of sudden puffs of wind, however, but on my inherent love of leisure.

When three or four men embark on a long cruise in a small boat, the novelty of steering or trimming sheets soon wears off and sailing becomes a business. It never becomes a monotonous business, because the sea and the weather are constantly changing, and it is always as much fun to put to sea and stay there as it is to put into harbor and stay there. Business though it is, sailing should never degenerate into a duty or a hardship, and the way to keep it out of either class is to arrange that all hands have their regular sleep.

On a yawl this arrangement consists of setting the sails at night so that one man may stand his watch alone, regardless of what comes in the weather line. If it is blowing hard at sundown, all hands may lower the mainsail before the night routine starts, and the man on deck can be satisfied that he can handle, unaided, any situation that may arise throughout his watch. The same applies in squally, unsettled weather, when it is calm one moment and blowing furiously the next. The jib and jigger are left standing, and while, during periods of calm, they do not slap about annoyingly or dangerously, they present sufficient sail area to carry the boat along nicely when a stiff breeze springs up. Only with the yawl rig can this ideal combination of enough canvas for headway and not too much for safety be effected.

WEATHER IN THE CARIBBEAN

While on the topic of weather, I may as well answer the burning question that has often been asked me with respect to sailing in the Caribbean in the summer season: "Isn't it too hot for comfort in the tropics?"

The answer is yes and no, and depends on the kind of clothes you see fit to wear. If you want to dress yourself in a full consignment of garments from stiff collar and necktie to spats and patent leather shoes, it is too hot. But if you are contented with a bathing suit by day and a flannel shirt and khaki trousers to slip over it by night, it is not too hot. Hardly a night passed when Hippocampus was south of the Tropic of Cancer that the warmth of a blanket wasn't welcomed in our bunks or that we didn't relish the extra protection of a slip-on sweater during the midwatch.

I may add that I have never come nearer to freezing to death than on the afternoon when, off the south coast of Cuba, a sharp rain storm caught me on deck with all my clothes off. My shipmate, Squibb, who was in the same predicament, stuck it out, but at the risk of flooding the cabin I dived below and got myself into a full suit of sweaters and oilers. Ten minutes later, of course, the day was as hot as it had been cold; but there was always the recourse of a cool dip over the side.

THE FRIENDLY SHARKS

"Oho!" says the incredulous Northerner. "Did you dive over the side whenever the spirit moved you?"

Well, strictly speaking, we did not. I have never seen a shark bite a man and I have never seen a man who has seen a shark bite a man, but I have heard of a thousand men who have seen a man who saw a shark bite a man. That's rather complicated, but it's enough for me. As recounted in my cruise story I had an experience with a shark that made me still more wary, but even that did not keep us from trailing circumspectly from the bumpkin on occasion.

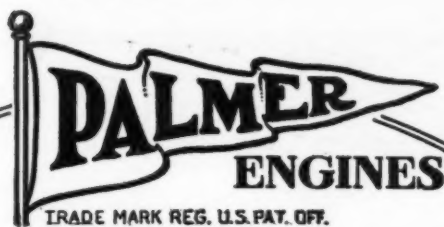
The day we landed at Los Indios on the Isle of Pines, Cuba, I so far forgot my habitual caution as to dive overboard to carry a mooring line to a wharf jutting out into deep water. I clambered safely up, secured the line, and returned aboard to adorn my person again with wrist watch and spectacles. And that short interval of time was all that a small Cuban boy required to make the quarter mile from shore to head of dock.

"Hey," he cried, panting and gasping from his rapid running. "Sharko; malo." And he made the gestures of diving and swimming. From his haste and worried expression as much as his words, I gathered that it was unhealthy to swim in those parts; and although subsequently we grounded the yawl and cleaned her sides in shoal water that was reasonably thickly populated with small, friendly hammerheads, I never again played the role of water spaniel in deep water.

THE STUPID MOSQUITO

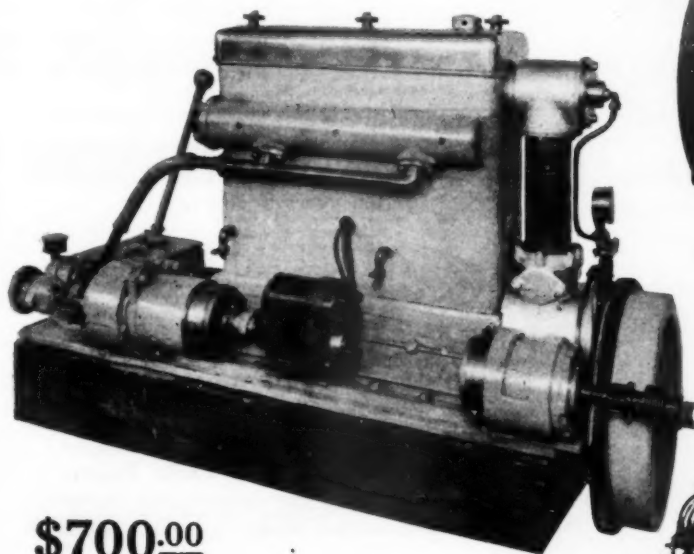
I was on the point of remarking that just as I have never seen a man being nibbled by a shark, I have seen a tropical

(Continued on page 88)



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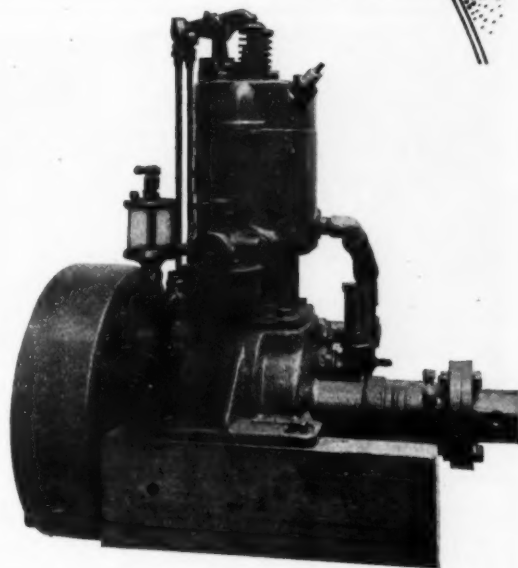


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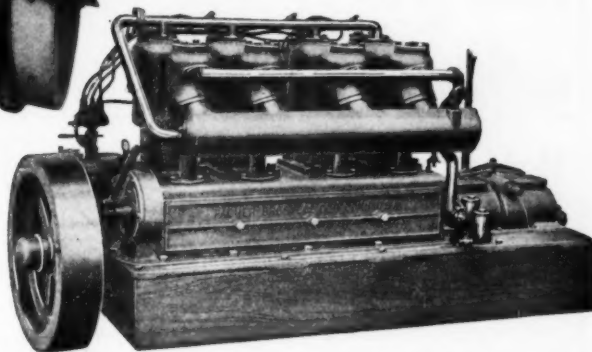
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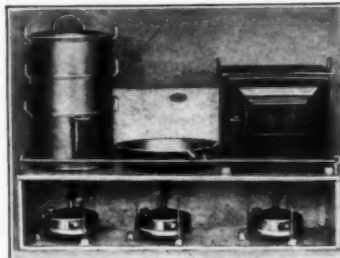
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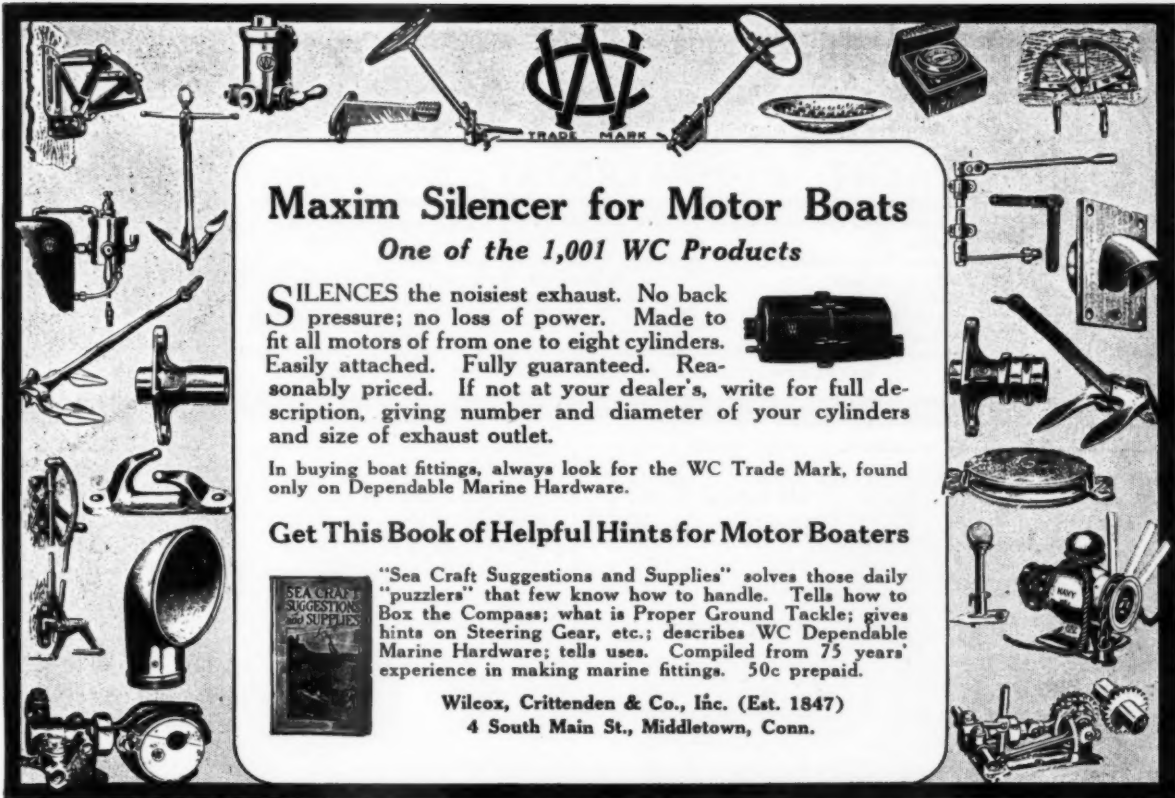
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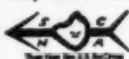
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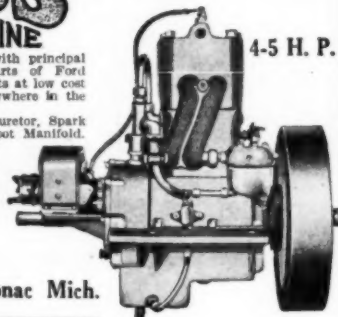
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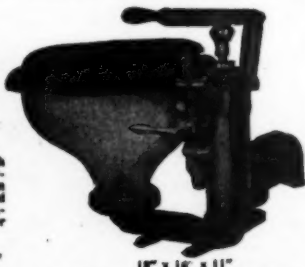
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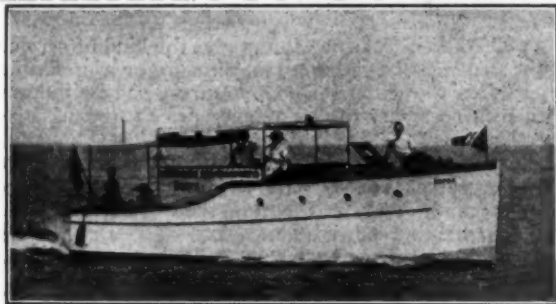


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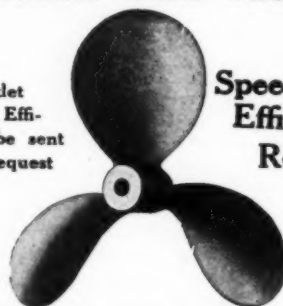
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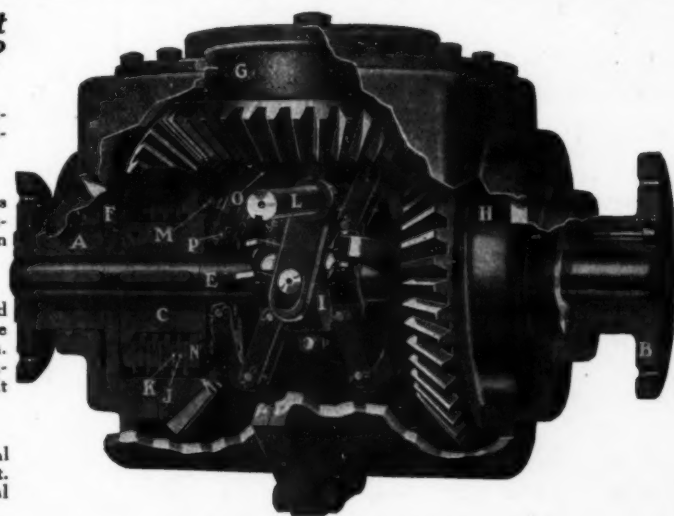
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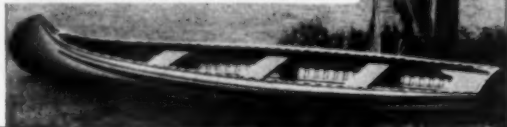
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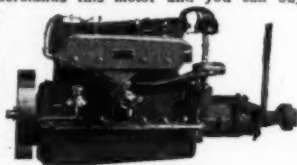
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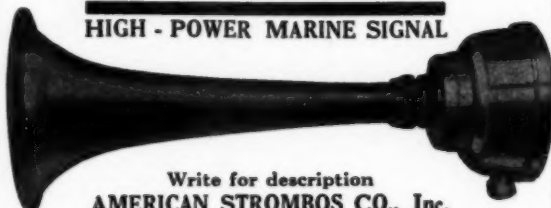
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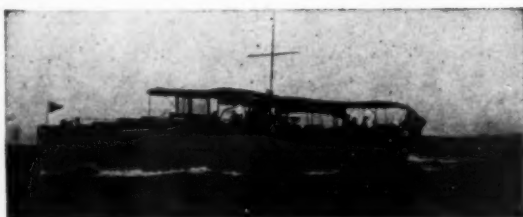
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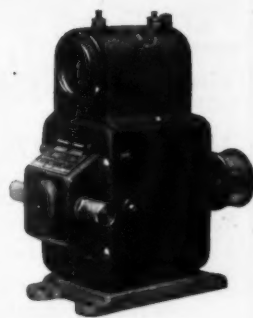
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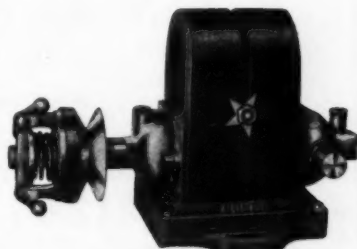
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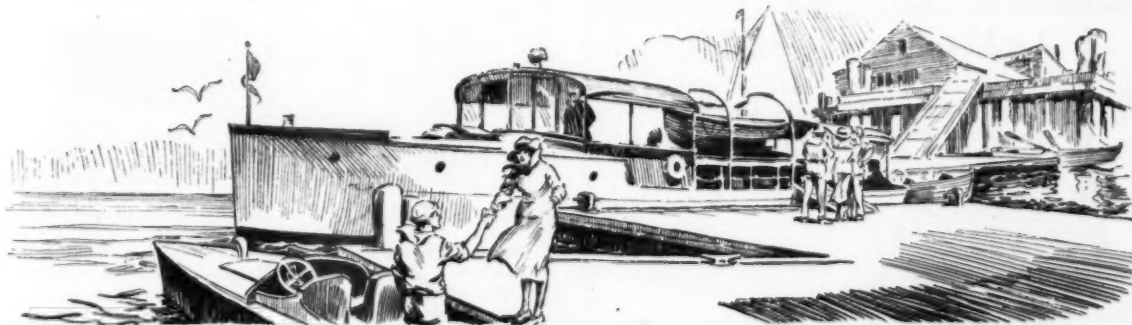
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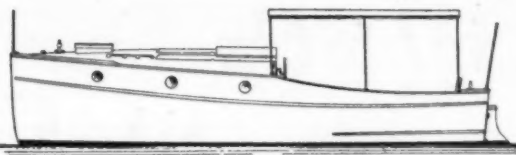
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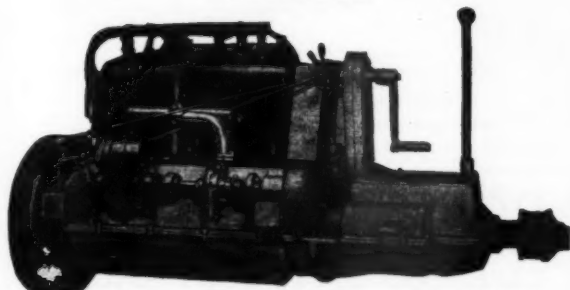
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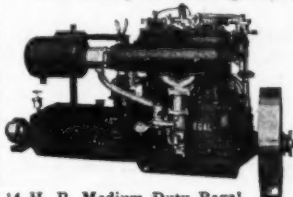
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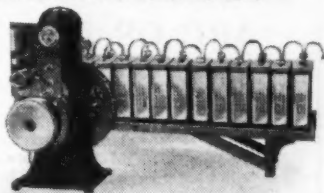
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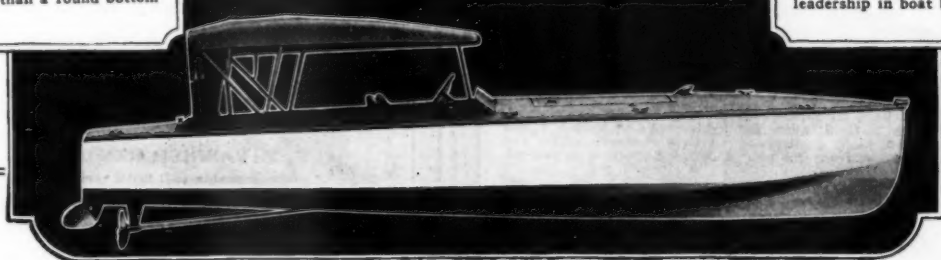


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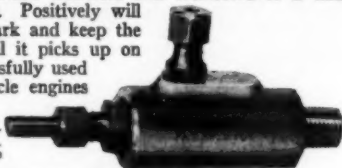
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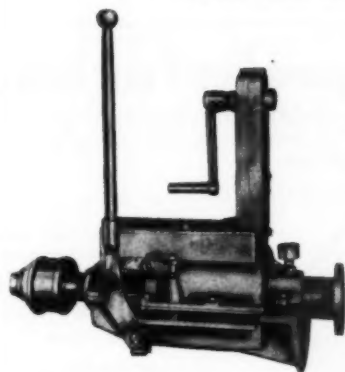
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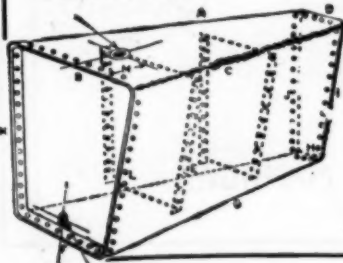
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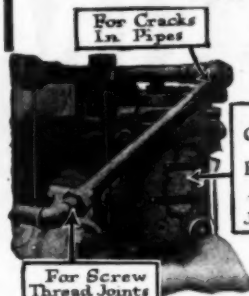
Practical Man's Model, oak finish, galvanized fittings.
Powered with Fay & Bowen LN-41, 16 H.P. Speed 9-10 miles per hour.
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Unlike anything you have ever seen. Built entirely of brass with our own specially designed heavy glass reflector and bulb.

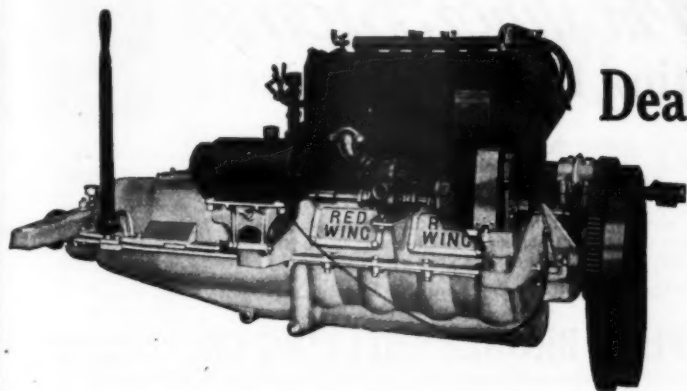
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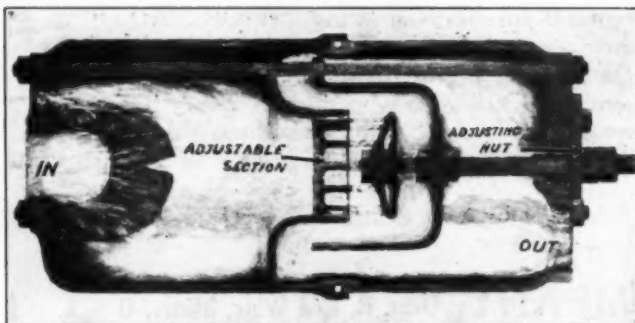


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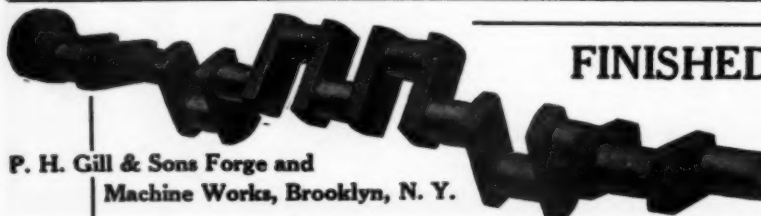
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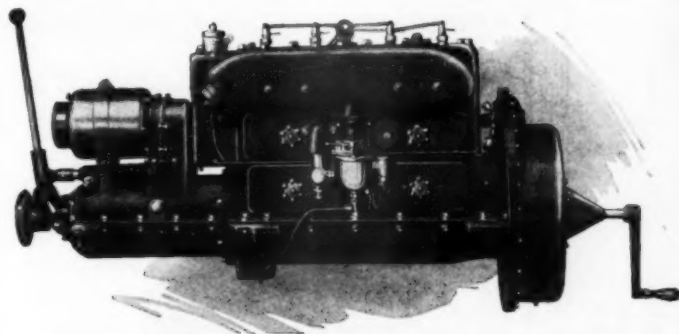
All moving parts are enclosed, save the magneto drive shaft. Oil scattering is entirely eliminated.

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Model 44, 14-20 H. P. 4 cyl. 4 cycle.
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COMPLETELY ENCLOSED — COMPLETELY EQUIPPED

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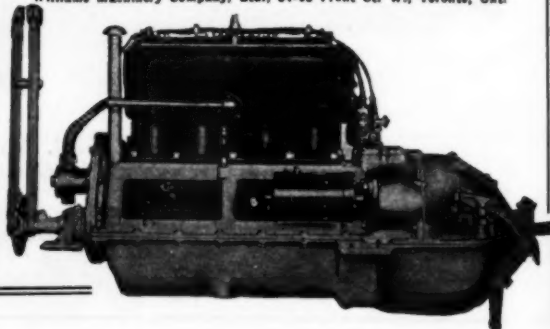
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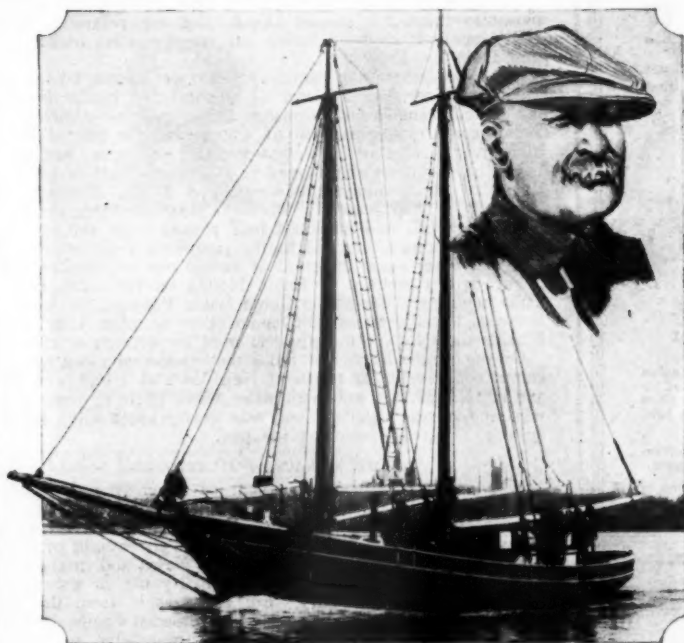
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Says Cap'n Allswell

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The Cap'n is holding out on you. Send for Columbian folder No. 5 and get the whole story.

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COLUMBIAN *Bronze* PROPELLERS

Worth
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Points

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*Plenty of
room for
the crew!*

COLUMBIAN ELECTRIC LIGHT AND POWER

C-Y-C Model

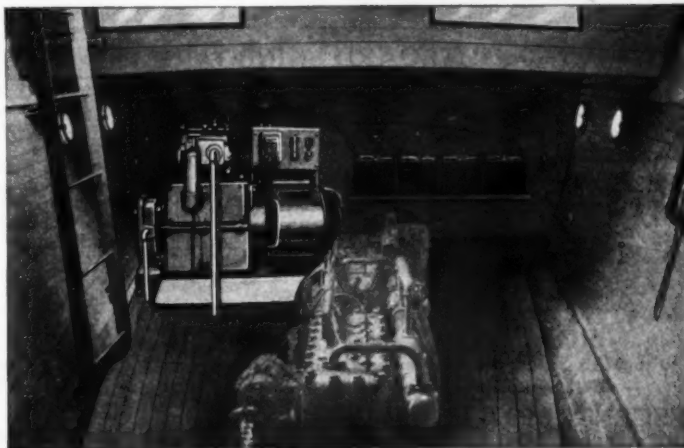
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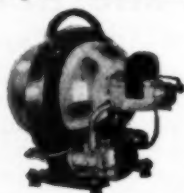
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Easy to stow away yet always ready for instant service.

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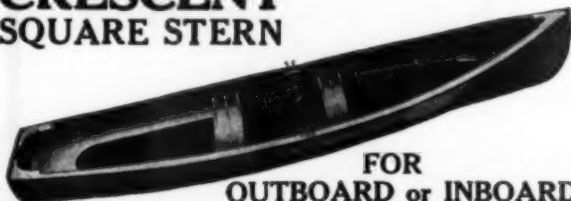
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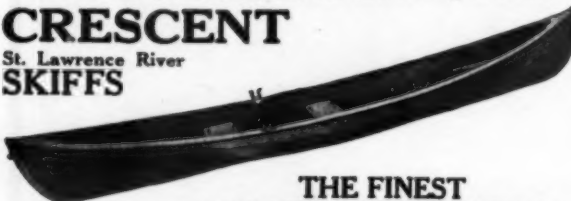


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CRESCENT MOTOR BOAT CO.

Clayton, Thousand Islands, N. Y.



Advertising Index will be found on page 130

Random Thoughts On Sailing

(Continued from page 70)

mosquito thirst for human blood. But my reference to Los Indios reminds me that during our stay there we had a visitation from the little pests.

After washing Hippocampus's sides we sought advice from the port officer, the collector of customs, the health inspector, the dock foreman, the steamship agent, and the mayor of Los Indios concerning the depth of water over the bar of the Indian river. He said there was six feet of water, and we believed him until we ran around in four and a half feet. It was then that the mosquitoes descended on us and demanded our life's blood. But presently, when the tide had lifted six inches, we kedged off, and anchored half a mile from shore. Those stupid mosquitoes returned to the jungle to feast on crocodile hide and never again molested us during our stay in Los Indios.

For fifteen minutes in Bahia Honda on the north coast of Cuba, and for one night in Gatun Lake, Panama, we were also bothered by mosquitoes, but on no other occasion after leaving Florida did we have the slightest need for screens or citronella.

On my return home last fall I met a man who had spent the summer almost as far north of New York as I had been south, and he told me that well within the Arctic circle he wore gloves, veil, and canvas leggings, and was nearly eaten alive by mosquitoes. There's a contrast for you.

THE MENACE OF HURRICANES

When we put Hippocampus out of commission in Panama, and Squibb and Chambers embarked for points south, I secured passage as a deck hand aboard a Panama liner and worked my way north. And I worked. I learned the weight of a holystone as I never did in my hitch in the Navy, and in eight days I suji-wujied enough paintwork to qualify me as a first class paint washer extraordinary. But that's aside from the point.

After four o'clock of each day we foremast hands were permitted to amuse ourselves, and as my chronometer, sextant, and books were in the safekeeping of the captain I used to wander up to the bridge and do a little unofficial navigating. On the afternoon that we approached the town of Port au Prince, Hayti, the third mate, with whom I was talking, looked aloft and said there was trouble brewing. I looked up too and all I saw were a few ragged clouds with the same suggestion of pink on their edges that I had seen any number of times during the preceding three months. Being sane, if not weatherwise, I stifled the impulse to say that the sky looked fine to me.

The next afternoon I read in my bunk after knocking-off time, and I was surprised to hear some of the crew talking at supper of having sighted Cape Maysi (the western end of Cuba) at a distance of about six miles. Now I knew that our course was carrying us fully twenty miles from Cape Maysi and I questioned one of the men with some particularity about what he had seen. He had made out, he said, a lighthouse as plain as the nose on his face (he had that kind of a nose), and had seen individual trees, and he supposed that for some reason the Old Man had changed course.

That didn't seem reasonable to me and I was thoroughly mystified when, observing that the third mate was again on watch, I climbed to the bridge for information.

"Hello," he said. "Remarkably clear weather we're having. I sighted the tip of the mountain on Cape Dame Marie a while ago and that's fully a hundred miles off."

I looked at the third mate and he looked at me, and I understood why Cape Maysi had seemed to the crew only six miles away.

Just then the radio man came forward with a message for the captain, and that message read, "Hurricane reported from Trinidad, moving west-northwest across the Caribbean."

As that was as near as I came to the only hurricane that swept through the West Indies in 1921 I cannot qualify as an expert in hurricanes. The ship was well out of its track and we felt only the mighty roll that it sent out hundreds of miles in all directions. For two days the deck stewards were fairly busy with the passengers, and then the sea flattened out as the disturbance passed away. But the next time I see a certain peculiar effect of clouds and light which is followed by a period of extremely high visibility, I'll know better than to doubt the word of an oldtimer who tells me that there's trouble brewing.

THE FLY IN THE OINTMENT

The menace of the hurricane is the only fly in the ointment of summer cruising in the Caribbean. Everything else you can get used to—calms, squalls, and even water spouts—but you can't laugh away a big twister. I believe implicitly the words of a succession of sea captains that it is only by a miracle that a small boat will live through a hurricane.

Gales, these wise old dogs of the sea tell me, are nothing to snivle over, and the smaller you are, down to a certain limit, the better your chance of coming through unharmed.

(Continued on page 96)

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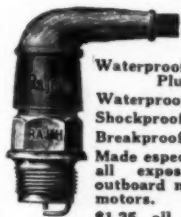
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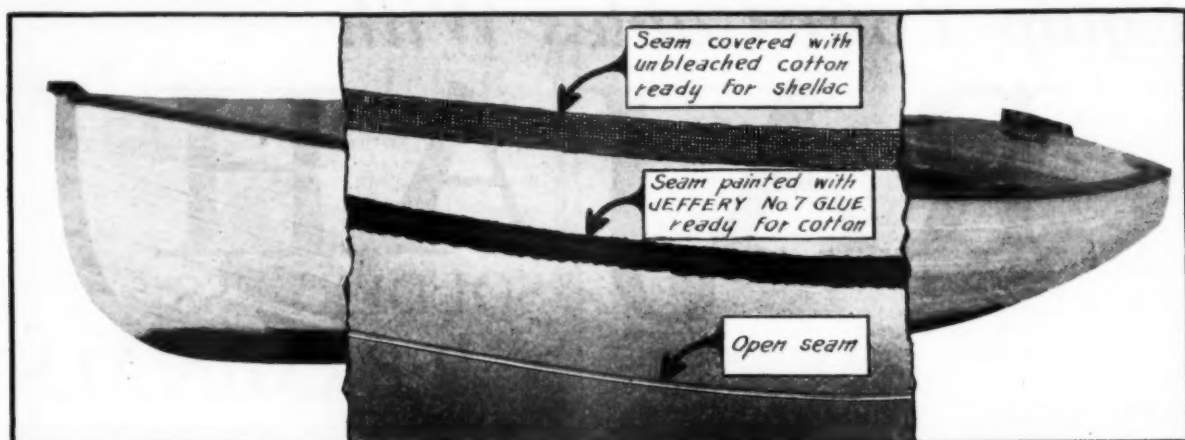
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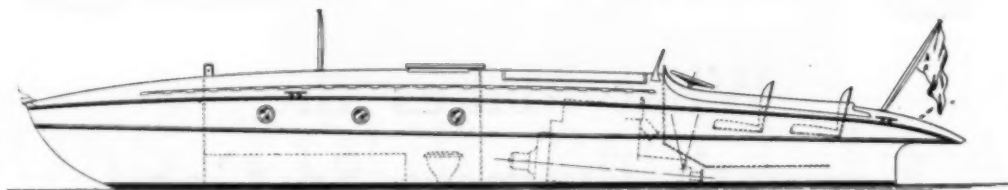
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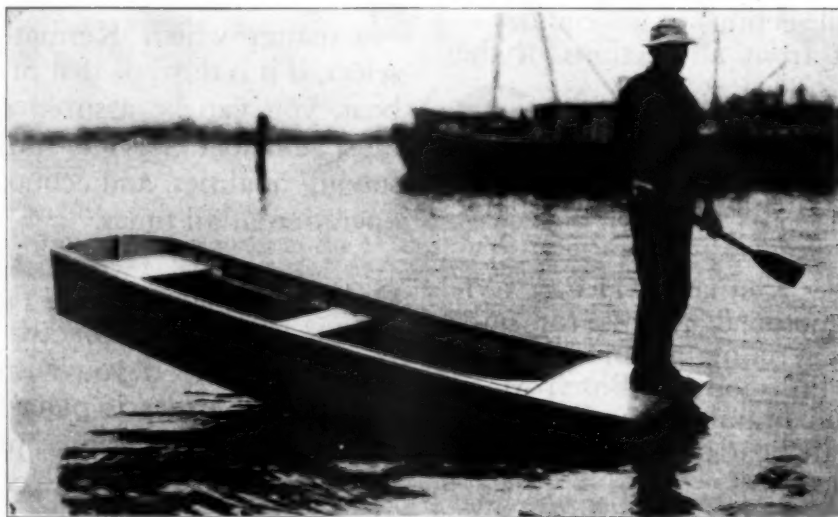
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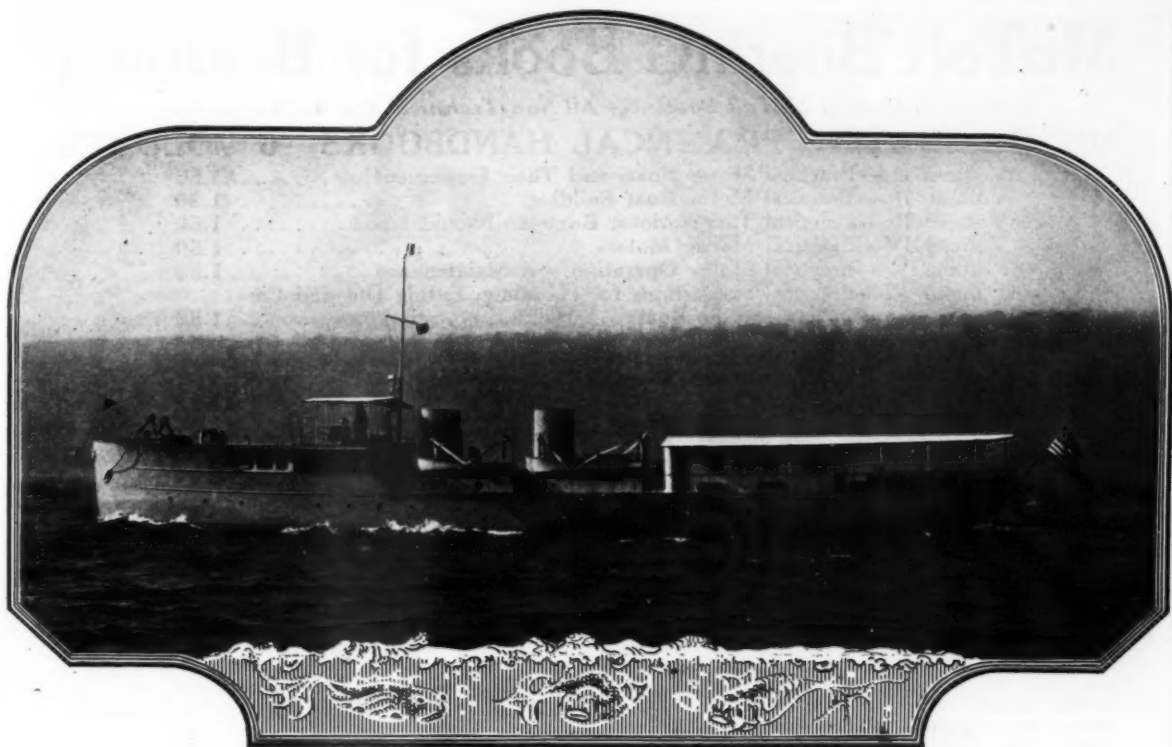
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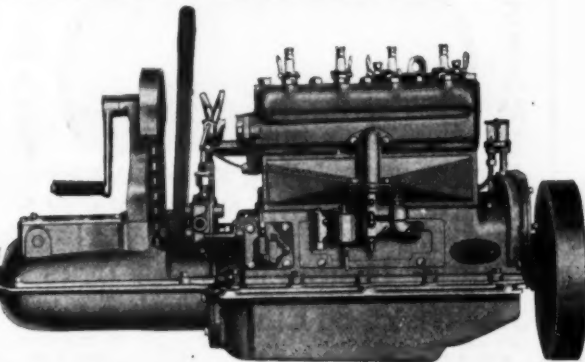
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Random Thoughts On Sailing

(Continued from page 88)

Although the sea builds up into mighty mountains, the waves move in a steady procession, and you can easily live through the chop that rides them. But in a hurricane the wind not only blows with a force sufficient to rip iron hatch covers loose from their fastenings, but the sea comes in from all directions and piles up in a smother that will swamp even the tightest small boat.

Nevertheless, I am less frightened of hurricanes now than I was before I knew a solitary thing about them. In my guileless, unarithmetical way, I used to read on the Pilot Charts that, say, six per cent. of hurricanes occur in the Caribbean in July, and twelve per cent. (of whatever it is) in August, and so on, and somehow I had a picture of six hurricanes waltzing across Jamaica in every seventh month of every year. But, bless me, that is not at all the case. They haven't had a hurricane in Jamaica for five or six years, and there are thousands of little pickaninnies running around naked who never even heard of one.

If I say, as I should have said much earlier in this article, that the Caribbean is the best, the most satisfactory cruising ground that I've ever struck, from the standpoints of temperature, scenery, freedom from inclement weather, and absence of insects, wouldn't you cruise there in summer on the off chance that no hurricane would hit you? I don't say that the menace of the hurricane ever leaves you. You are conscious of it waking and sleeping, and when American consuls and other weather sharps tell you wisely that a perfectly well-behaved gentlemanly sort of day looks hurricane-y, you have to restrain the impulse to do murder.

But I have never yet heard a yachtsman say that the mere consciousness of possible danger detracted from his enjoyment of the moment's pleasure. Living in the vicinity of hurricanes you get used to them just as a city man gets used to mail trucks and taxis, and neither the sailor nor the city man wears a mourning band around his sleeve because he may get picked off any minute.

Besides all of which, news of hurricanes always comes by radio at least two days in advance, and it's surprising how far in land you can run in forty-eight hours.

THE INDISPENSABLE MOTOR

I started this article with the intention of telling what I had learned about sailing during a voyage of three or four thousand miles, and it has taken me right to the end of my space to say that I don't know much about it. When we started from New York and ran into our worst weather almost immediately I knew less than nothing about handling a yawl, and if it hadn't been for the skill of Chambers we would probably have ended the cruise there and then. But by force of example and under the buffeting of experience I did pick up a trick or two; and I think now as I thought when I was shrouded in abysmal ignorance that sailing a small boat is easy.

Of course, the power that you pack away in your auxiliary engine is what makes it easy. I used to be a motor boatman, pure and simple—more or less pure and fairly simple. Now I am a sailboatman from the word go. But I am a motoring sailboatman, and when the wind dies and I find myself drifting stern first toward a rocky ledge I start the engine and get away from there. Similarly when it was proved by experiment that Chambers, excellent sailor though he is, endangered both Hippocampus and the port of Havana by making a landing under sail, we doused canvas and startled the natives with our skill as motor boatmen.

So if all hands will follow my two-fold, double-acting advice of never putting to sea in a motor boat that is unequipped with sail, or in a sailboat that has no auxiliary engine, there'll be no blood on my head.

The Van Sicklen Tachometer

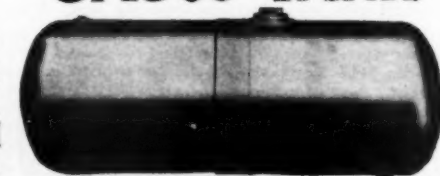
One of the most essential items of equipment for every motor boat is a tachometer to indicate at all times at just what speed the engine may be turning. It is further essential that the instrument be absolutely accurate as a false reading is as good as none at all. The Elgin National Watch Company, Elgin, Ill., have developed a chronometric tachometer called the Van Sicklen. This instrument of absolute accuracy is produced in a plant which has long been accustomed to working with precision instruments. While there are many forms of tachometer available the Van Sicklen type is distinctive since it uses a watch mechanism combined with the counting mechanism in order to check on the accuracy. Readers of MoToR Boat-ing will be supplied with a descriptive catalog of this instrument if they will write to the Elgin National Watch Company, Elgin, Ill.

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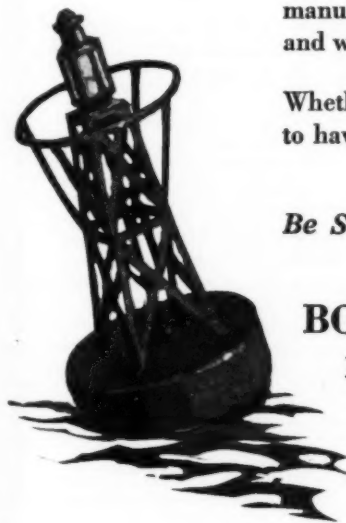
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Navigation by Dead Reckoning

(Continued from page 33)

tabulated for each degree and fraction of a degree, we could solve any triangle, provided we were given certain necessary parts to start with. For the other parts would stand in the proportions which go with that angle. If, for instance, with a 30° angle at C, the opposite side of a right triangle is .5 (decimal) of the length of the hypotenuse, we could always find the length of opposite side by multiplying the hypotenuse by .5. And we could find the hypotenuse by dividing the opposite by the same decimal.

The fact is that the proportions between the various sides are all known and tabulated. These proportions or relationships are called the functions of the angle. By dividing a certain side by another, we obtain a decimal representing a function. With this decimal, we may go into the table and find the angle it stands for. Or, knowing the angle, we may go into the table and find the function expressing the proportion between certain sides of a right triangle having that angle. And this proportion will apply to and solve any triangle, having that angle, irrespective of its size.

An interesting experiment is to take a protractor and lay off a 30° angle, and then draw a number of opposite sides, as in Fig. 15. You will thus form several similar triangles of different sizes. Now carefully measure the length of the several opposite sides and hypotenuses, and divide the opposite of each triangle by its hypotenuse. The answer will be the same in each case, and will be .5, which is the natural sine of 30°.

Functions as lines. There was an old-fashioned way of describing the functions, which modern writers have largely discarded, and in some instances condemned. But it has the advantage, at least, of being graphic. The old writers often treated the functions as the actual length of certain sides of triangles, having a radius of unity, that is, of 1. This unit did not have to be in any particular kind of linear measure; it might be an inch, a foot, a yard, or whatever. The scheme was to describe a circle, with a radius of unity, divide it into quarters, and draw triangles within and tangent to the circle, as in Fig. 14. The mathematicians did not draw the diagram precisely as we have it. They had the triangle "turned over," with the tangent at the right, instead of at the top. While there were good mathematical reasons for so doing, the form shown in Fig. 14 is more convenient for our purposes. The angle at C might be any angle desired. Then the side AD will be the sine, and the side CA the cosine; and if we measure them, we will obtain the natural sine and cosine of that particular angle; that is, the actual length of the opposite and adjacent sides, the hypotenuse being 1. Thus, by drawing successive triangles for every degree, and measuring the opposite and adjacent sides, we could construct a table of natural sines and cosines. And as a matter of fact, if we made a careful large scale drawing, we could get up a fairly accurate table. Now if these sines and cosines are the actual lengths of the opposite and adjacent sides of triangles whose hypotenuses are 1, they will enable us to solve any triangle by proportion. If the hypotenuse is 5, the opposite side will be 5 times the sine, or if the hypotenuse is .3, the opposite will be .3 of the sine, and so on. So as to the cosine or adjacent side.

The same scheme applies to the tangent, except that with it the adjacent side is unity, instead of the hypotenuse.

It makes little practical difference whether we think of the functions as the actual length of the respective sides of unit triangles, or as proportions between the various sides. Proportions they no doubt are, for they express the relationship between sides, irrespective of the size of the triangles involved. And they are properly deemed functions of angles, for it is the angle which controls their value.

There are many functions, but the dead reckoning triangle may be solved with the sine, cosine and tangent, and we shall now limit ourselves to these. They are expressed by the following equations, which should be committed to memory:

$$\text{sine } C = \frac{\text{opposite side}}{\text{hypotenuse}}$$

$$\begin{aligned} \text{cosine } C &= \frac{\text{adjacent side}}{\text{hypotenuse}} \\ \text{tangent } C &= \frac{\text{opposite side}}{\text{adjacent side}} \end{aligned}$$

C in each case being the particular angle we happen to be dealing with, which, in dead reckoning, is the course.

These formulae mean, the sine of the angle C equals the opposite side divided by the hypotenuse, etc. The meaning is the same as in common fractions, where $3/10$ equals $3 \div 10$, or .3.

The natural sines and cosines are found in Table 41 of Bowditch, p. 746, et seq.

Let us digress to explain this table. The number of the degrees appears at the top (or bottom) of the page in bold type. The columns at the sides marked M indicate the minutes of arc. Thus, if we want sine 30°, open Table 41 (p. 752) to the column headed 30°, and there at the top under "N. sine" (natural sine) and opposite 0 in the M (minutes) column, is 50000. This is the natural sine of 30°. Really, the sine is .50000 (decimal), the decimal point, however, being omitted in the table. If sine 30° 45' is wanted, run down the same 30° sine column to 45 in the M column, and opposite 45 is .51129, which is the natural sine of 30° 45'. Right alongside of the natural sine of 30° 45', in the second column, headed "N. cos." is .85941, which is the natural cosine of 30° 45'. The table is so arranged that the functions of angles of less than 45° are found at the top of the page, and those greater than 45° at the bottom. When entering the table for angles at the top, read down, using the left hand M column. If the angle is at the bottom, read up, using the right hand M column. And note that at the top, the sine column stands at the left of the cosine column, while at the bottom, it is at the right; that is, the names of the columns are transposed. The table is arranged in this fashion because each function of an acute angle is equal to the co-named function of the complementary angle. For instance, the sine of 30° equals the cosine of 60°, and so on. At 45° the sine and cosine are equal. The arrangement does away with a dual printing of the same figures.

Now stop right here. Open Bowditch, and turn to Table 41. The foregoing may seem like mere words. But with the table before you, it will be perfectly clear. The difficulty some students have with trigonometry arises because they persist in skimming through it as if they were reading Nick Carter's latest. Instead of working the problem or looking up the table, they skip it, and rush on with a half-baked notion about something or other but heaven only knows what. The practice is thoroughly bad, and apt to end in failure and discouragement. It is better to make haste slowly. Take time. Take all the time necessary. Look up every table and work every problem. And then feel the gratification of real progress.

As said above, the functions have all been computed and tabulated. We need but pick them out and use them. Take the sine. It is the proportion of the opposite side, divided by the hypotenuse.

$$\text{sin } C = \frac{\text{opposite}}{\text{hypotenuse}}$$

With this formula, many problems may be solved. If

$$\text{opposite} \div \text{hyp.} = \text{sin } C$$

then,

$$\text{sin } C \times \text{hyp.} = \text{opposite}$$

and,

$$\text{opposite} \div \text{sin } C = \text{hyp.}$$

The switching around of one formula gives three solutions.

Students are sometimes puzzled at this. They are accustomed to multiply and divide with figures, but not with names. If the sides were numbers, it would be easy. Plainly,

$$\begin{aligned} 6 \div 3 &= 2 \\ \text{and } 3 \times 2 &= 6 \\ \text{and } 6 \div 2 &= 3 \end{aligned}$$

(Continued on page 100)

What Does It Weigh?



Every Johnson outboard motor is guaranteed to operate satisfactorily as claimed and to be free from defects in material and workmanship.

Attached to Canoe Gives Power Boat Speed

The lightweight Twin Cylinder 2 H. P. Johnson is the most practical motor for use with canoes. It drives through the water smoothly and quietly at thrilling speed. Its complete absence of vibration prevents shaking canoes and opening seams. Its extremely light weight prevents top heaviness and dipping. In addition to the Lightweight Johnson for rowboats we make—Inboard and Outboard Installations for Canoes. The same power unit is interchangeable for all installations; can be changed from one to the other in a few minutes.

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Navigation by Dead Reckoning

(Continued from page 98)

Someone may be helped, at first, by writing little key numbers over the parts of the formula. Try this:

$$\begin{array}{rcl} 6 & & 3 \\ \text{opposite} \div & \text{hyp.} = & \sin C \\ 2 & & 3 \\ \sin C \times & \text{hyp.} = & \text{opposite} \\ 6 & & 2 \\ \text{opposite} \div & \sin C = & \text{hyp.} \end{array}$$

Notice we have kept the same figure over each factor throughout.

Using the sine, three problems may be solved:

1. With the hypotenuse and angle, we can find the opposite.
2. With the opposite and angle, we can find the hypotenuse.
3. With the opposite and hypotenuse, we can find the angle. That is, in this case, we find the sine of the angle, and then look in Table 41, and match it up with the nearest number there given, and then read off the angle represented by that number.

If the scheme of any one function is grasped, it is easy enough to understand the others. They are likewise proportions, but represent the ratios between different sides.

The sine is the ratio between opposite and hypotenuse.

The cosine is the ratio between adjacent and hypotenuse.

The tangent is the ratio between opposite and adjacent.

The cosine and tangent formulae may be transposed in like manner as the sine. Each of them thus solves several problems.

The foregoing may suffice to explain the few elements of trigonometry needed to solve the dead reckoning triangle. In the dead reckoning triangle,

- 1 The angle is the course (C)
- 2 The hypotenuse is the distance (Dist)
- 3 The adjacent side is the difference of latitude (DL)
- 4 The opposite side is the departure (Dep)

And since these are the expressions we are to use, let us now throw out the mathematical names and assume the names of the sea. Then our three fundamental dead reckoning formulae become:

$$\begin{array}{rcl} \sin C & = & \frac{\text{Dep}}{\text{Dist}} \\ \cos C & = & \frac{\text{DL}}{\text{Dist}} \\ \tan C & = & \frac{\text{Dep}}{\text{DL}} \end{array}$$

With these we can solve all dead reckoning plane triangles. The formula we shall use will depend on the elements we have to work from and the unknown element sought. But here is a rule that holds good in all cases:

If our problem involves:

| | | |
|--------------|-----|---------|
| Dist and Dep | use | sine |
| Dist and DL | use | cosine |
| DL and Dep | use | tangent |

Fig. 16 may prove an aid to memory.

Now try a few examples. Since Bowditch gives no table of natural tangents, we shall in this lesson only use cases which may be solved by the sine and cosine. These examples are merely for practice in the use of the functions. Natural functions are generally not employed in dead reckoning solutions, because of the tedious length of ordinary multiplication and division. To shorten this labor, logarithms are used. These will be explained in the next lesson.

Example 1. Ship sails C 39° Dist 179 miles. Required DL and Dep made good.

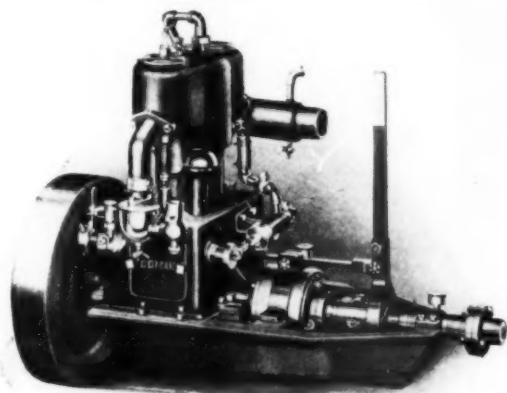
(Continued on page 106)

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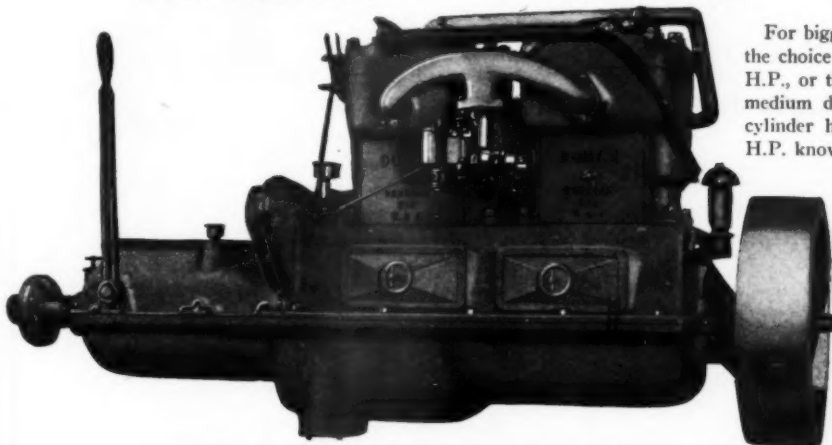
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"What gear are you using?"

"Not a Joes, but I soon will be."

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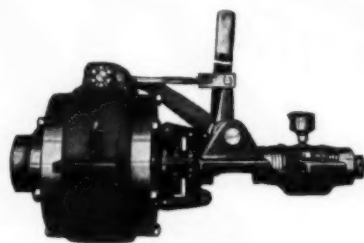
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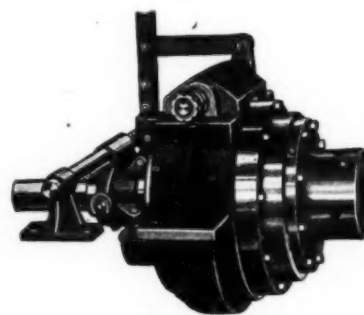
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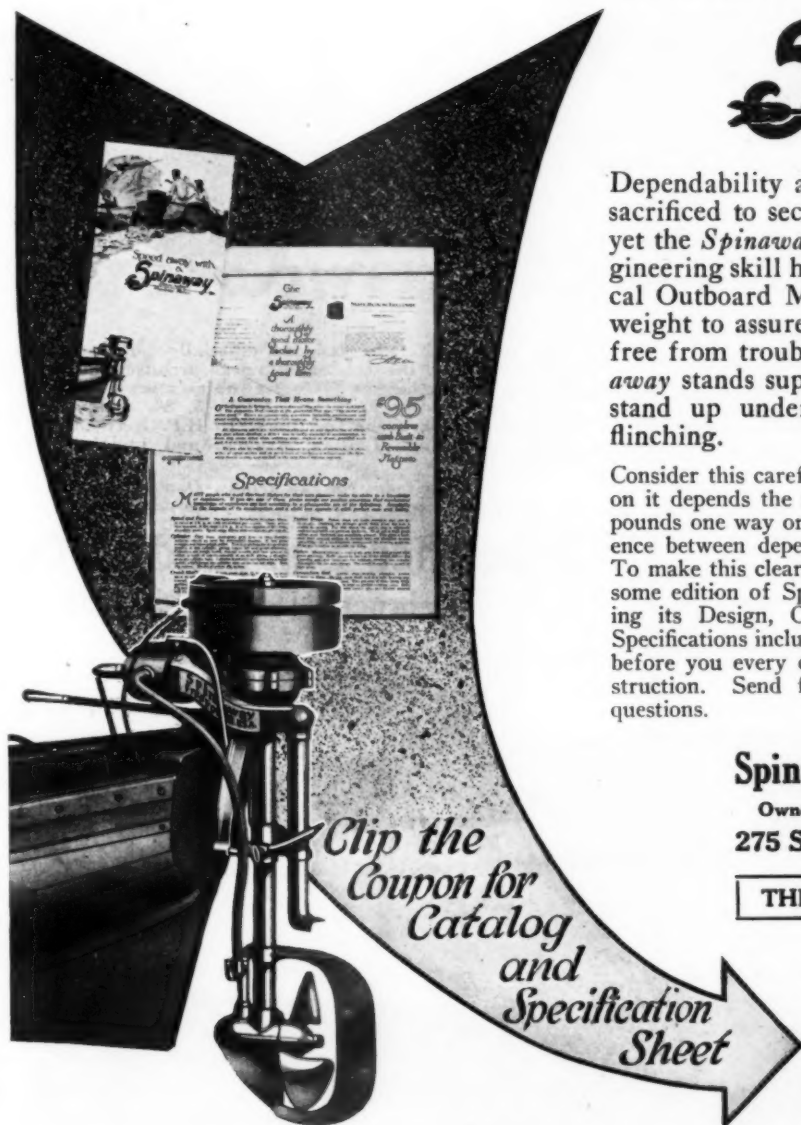
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THE Delanco 27 is the greatest value ever offered in a standardized cruiser. Whether you buy one at the old price or the new price, you will save \$1000 to \$1500 as compared with the price of any other stock boat of similar size ever sold.

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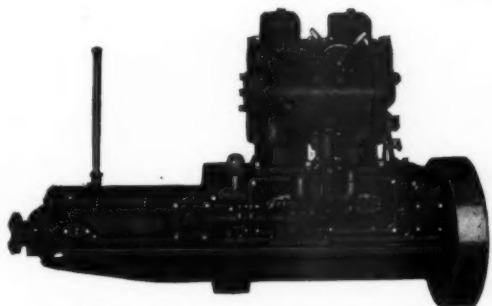
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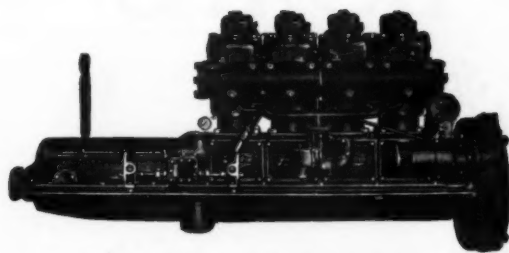
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Model T2, 2 Cylinders, 20 H.P.

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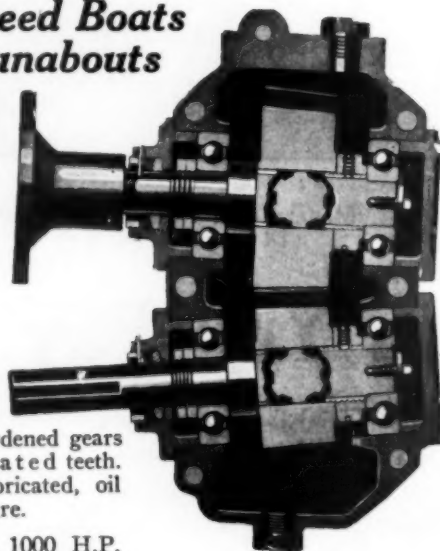
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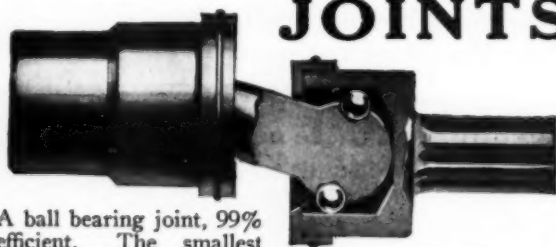
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Let us help you on your installation and power transmission problems. Cross products are now used by some of the best builders. Write today.

Cross Gear & Engine Company
3255 Bellevue Avenue Detroit, Michigan

Navigation by Dead Reckoning

(Continued from page 100)

| Formula | DL | Formula | Dep |
|----------------------------|-----------|-----------------------------|-----------|
| $\cos C = \frac{DL}{Dist}$ | | $\sin C = \frac{Dep}{Dist}$ | |
| or, transposed, | | or, transposed, | |
| $DL = Dist \times \cos C$ | | $Dep = Dist \times \sin C$ | |
| Dist | 179 | Dist | 179 |
| $\cos C (39^\circ)$ | .77715 | $\sin C (39^\circ)$ | .62932 |
| | 895 | | 358 |
| | 179 | | 537 |
| | 1253 | | 1611 |
| | 1253 | | 358 |
| | 1253 | | 1074 |
| DL | 139.10985 | Dep | 112.64828 |

Example 2. The Distance from Port A to Port B is 376 miles. B lies 138 miles East of the Meridian of A, and in a general northeasterly direction. Find the true course from A to B, and the DL between them.

| Formula | DL | Formula | DL |
|-----------------------------|----|----------------------------|--------|
| $\sin C = \frac{Dep}{Dist}$ | | $\cos C = \frac{DL}{Dist}$ | |
| 376) 138.00000 (36702 | | or, transposed, | |
| 1128 | | $DL = Dist \cos C$ | |
| 2520 | | Dist | 376 |
| 2256 | | $\cos C (21^\circ 32')$ | .93020 |
| 2640 | | | 7520 |
| 2632 | | | 11280 |
| 800 | | | 3384 |
| 752 | | | |

In Table 41, p. 750, 36702

equals $\sin 21^\circ 32'$ nearly.

Course is $N 21^\circ 32' E$.

Note—The first step in this problem is to find the course angle. Then, with C and Dist, the DL is found.

The student is urged to solve the following. Only by practice can proficiency be acquired. It will be found helpful to first draw a rough diagram representing the triangle involved.

Example 3. The C is $S 49^\circ W$, Dist 25.3 miles. Find DL and Dep. (Ans., DL 16.6S, Dep. 19.1W.)

Example 4. Vessel sails $N 45^\circ W$ 199 miles. Required, DL and Dep. (Ans., DL 140.7N, Dep. 140.7W.)

Example 5. A ship makes good a Dist of 179 miles and a Dep of 131 miles West. What was her C, and what is the DL made good? (Ans., C, $N 47^\circ 2' W$ or $S 47^\circ 2' W$, DL 122 N or S. From the data given, the C and DL might run in either direction.)

Example 6. X is 210 miles from Y, and lies between South and West therefrom. It is 102 miles West of Y. What is the C from Y to X, and what is the DL between them? (Ans., C, $S 29^\circ 04' W$, DL 183.6S.)

In the next lesson, the use of logarithms will be explained.

Harvey Two-Cycle Motors

A thoroughly well built and reliable two-cycle motor is the Harvey, being built by the Harvey Marine Motor Company at Rochester, New York. These machines were formerly marketed under the name of Leary motors and the four-cylinder model is being featured particularly at this time. Several improvements have been made recently which include the rear starter and reverse gear combined and other details in connection with the ignition and lighting system. It is furnished in two standard models which weigh 463 lbs. in cast iron and 267 lbs. in aluminum. The motor is a smooth running machine and develops 20 to 32 h.p. at various rates of speed.

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"Repair It NOW!"



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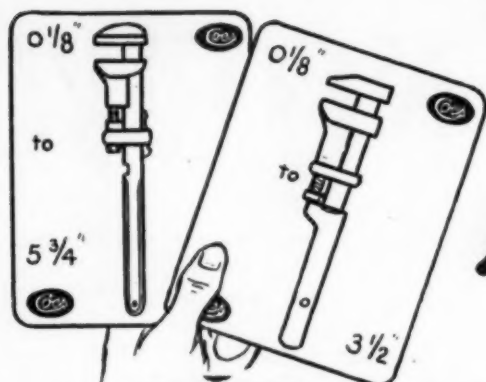
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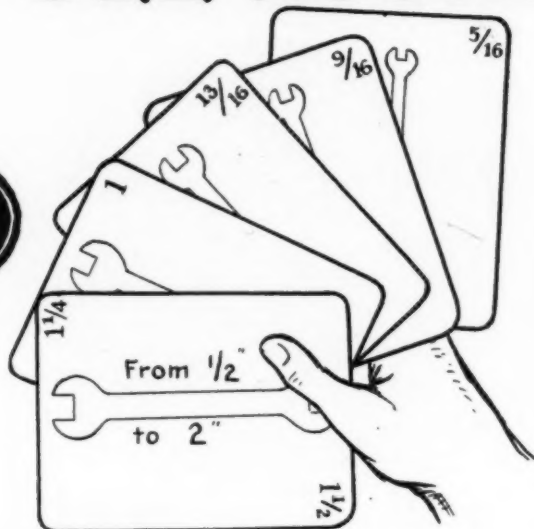
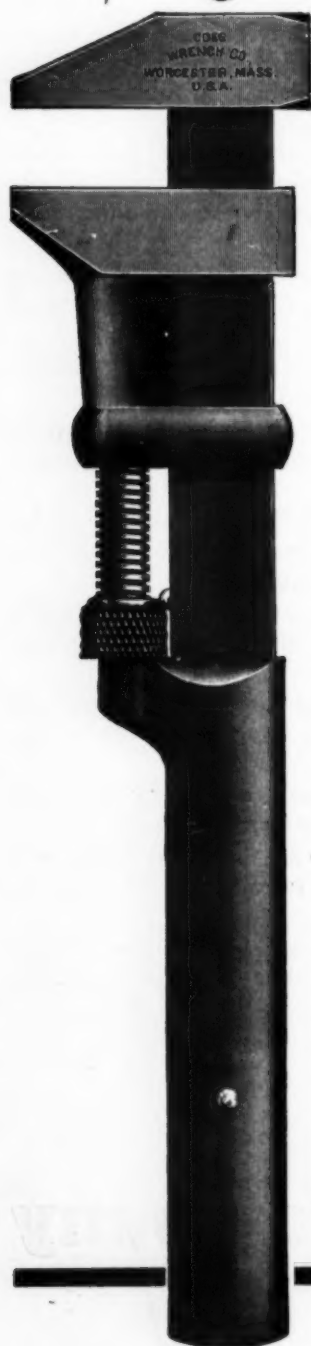
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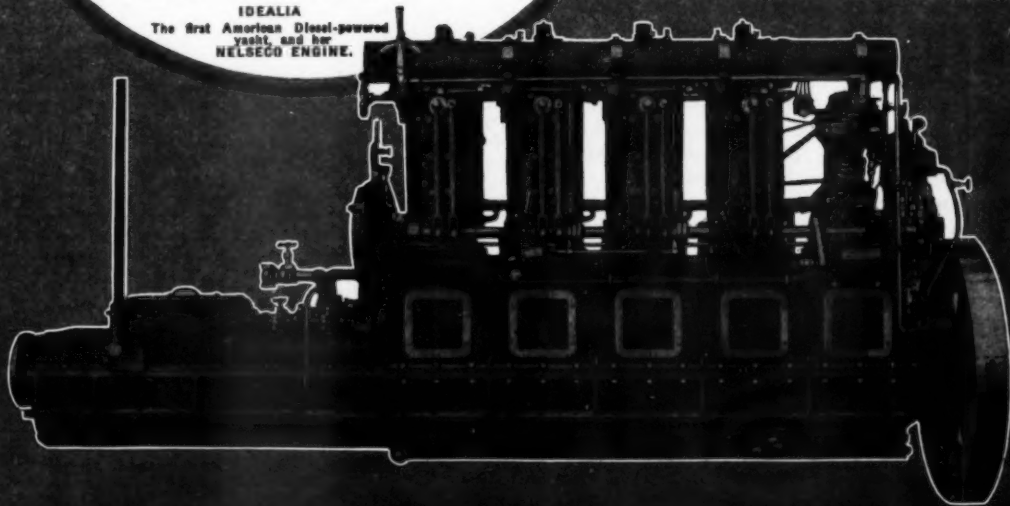
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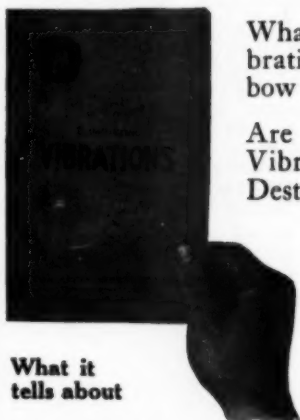
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Simplicity In Motors

(Continued from page 26)

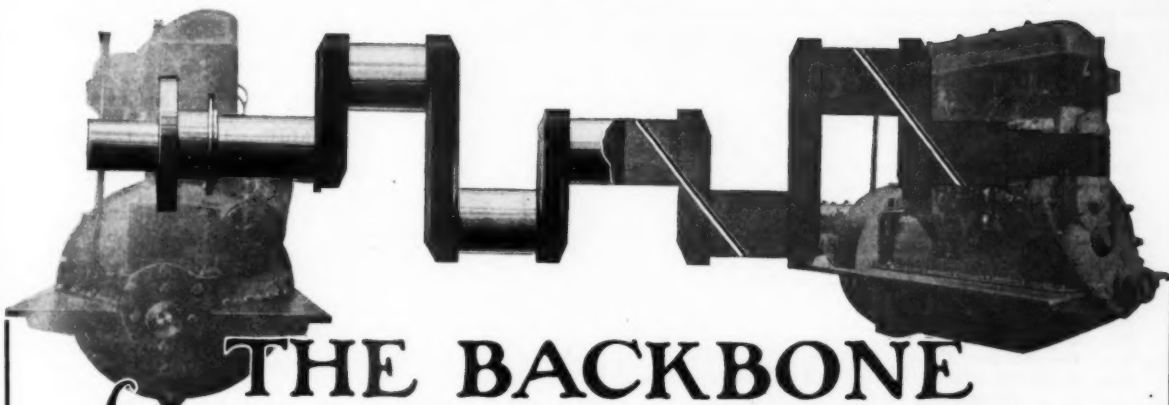
strikes the deflector plate on the top of the piston and is deflected upward to the top of the combustion chamber. It is not practical to clear the exhaust gas from the previous explosion entirely out of the cylinder so that the fresh incoming charge mixes with the residual exhaust gas as it passes out. The amount of mingling which takes place can be regulated to some extent by the relation of the ports. An early closing of the exhaust port will prevent all of the exhaust gas from escaping while a late closing of this port will permit some of the incoming charge to pass out with the last of the exhaust gas. It is quite impossible to prevent some mixing of the gases with a consequent loss of fuel and power. Attention is particularly directed to the projection on top of the piston which is called the deflector or baffle plate which is found only on the pistons of two cycle engines. This is cast as part of the piston head and is located off the center line and close to the port through which the fresh gas enters from the crankcase. It should never be placed on the exhaust port side of the engine as is sometimes done by careless assemblers. It serves to prevent the incoming gas charge from mingling with the exhaust gas by deflecting it upward and on rebounding from the top of the combustion chamber helps to force out the last of the exhaust before the port closes.

The particular type of engine which has just been described is termed the two port type because there are simply two ports controlled by the piston. Another kind of two cycle machine termed the three port type is practically identical with that described before with the single exception that the gas is admitted to the crankcase through a third port in the cylinder wall which is uncovered by the piston when it reaches the end of its upstroke. The check valve used in the other type is not required in the three port machine as the piston covers the ports at such times as to make this unnecessary. The operating principle is such that as the piston travels upward a suction or partial vacuum is created in the crankcase. As the piston approaches the top of its stroke the gas inlet port to the crankcase is opened and the gas rushes in to the carburetor at high velocity. In the two port type the velocity is much less as the check valve opens immediately and remains open throughout the entire piston travel permitting the entrance of gas for the full period. The remaining steps in the cycle are identical with those occurring in the two port type.

Still a third type of two cycle engine is sometimes used but is not universally known. This is the differential piston type. In this form of motor a piston is utilized which has an enlarged lower portion so that it virtually becomes a double piston. The lower portion of the cylinder bore is larger than the top to accommodate the larger diameter of this portion of the piston. This enlargement forms a pumping chamber. The inlet gas is drawn into this chamber and compressed there instead of in the crankcase as in the other types mentioned. It is then transferred to the upper or working end of the cylinder as is done in the two and three port engines.

An advantage claimed for this type of engine is that it is easier to keep a cylindrical piston tight than it is to have a tight engine base. As the bearings of the ordinary two cycle machine become worn a slight amount of air is drawn in through the worn parts. This dilutes and changes the mixture of gas in the crankcase and at the same time permits a leakage of the compressed gas to take place. As a result the volume of gas transferred from the engine base to the cylinder is reduced and a loss in efficiency occurs. In the differential piston engine the regulation form of piston rings can be used to keep the lower piston tight in its pumping cylinder.

Two cycle motors are not as efficient as the four cycle forms. This is mainly due to the difficulty in preventing the mixture of the incoming and exhaust gases. The problem of admitting the new charge while the exhaust is leaving or the other side of the cylinder is also one which has never been solved satisfactorily. The contamination of the new charge by the mingling of exhaust gas interferes with the rapid explosion, as the gas charge burns best when the mixture is pure. A certain loss also takes place in the amount of gas which flows out through the exhaust port while it remains open. The two cycle engine is not as flexible, that is it will not throttle down or govern to the same extent as the four cycle, nor will it attain as high a speed. They are very sensitive to variations in the mixture and instead of developing twice the power of a four cycle engine of the same piston displacement or cylinder dimensions will produce only about one and one half times as much power and consume twice as much fuel. However, they have been used with considerable satisfaction for boats requiring small amounts of power but they are rapidly falling behind the four cycle engine in the demands of the purchasing public. This was convincingly shown at the Motor Boat Show in New York by many of the oldest manufacturers of two cycle motors who are now building four cycle engines in very small units.



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PERFECT BALANCE IS OBTAINED—periodic vibration is absolutely eliminated in this crankshaft. No guessing—no experimenting is tolerated. Every shaft is put in perfect static and dynamic balance on Norton Balancing machines. This contributes to the smooth, vibrationless operation of Stearns motors and their velvet-like acceleration under even the heaviest loads.

You want power—dependability—all around satisfaction in a marine motor!—everyone does. Complete details regarding Stearns motors will exceed your expectations—you will become enthusiastic when you obtain our PRICES—THE LOWEST EVER QUOTED for engines of similar character. Inquire today.

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Charts printed on heavy cardboard $8\frac{1}{2}" \times 11"$ and punched to fit standard loose leaf folder.

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The third series of MoToR BoatinG's popular charts begins with No. 25, which covers the Delaware River from Trenton to Philadelphia. Others in this series which follow will complete the route to the sea via the Delaware River as well as cover many interesting stretches of cruising waters on the way south and along the coast. It is planned to issue these about as listed below:

- No. 25 Nov., 1921.. Delaware River, Trenton to Philadelphia.
- No. 26 Dec., 1921.. Delaware River, Philadelphia to Smyrna.
- No. 27 Jan., 1922.. New Jersey Coast, Cape May to Little Egg Inlet.
- No. 28 Feb., 1922.. New Jersey Coast, Little Egg to Barnegat Inlet.
- No. 29—March, 1922.. New Jersey Coast, Barnegat Inlet to Sandy Hook.
- No. 30 April, 1922.. Chesapeake Bay, Smith Point to Cape Charles.
- No. 31 May, 1922.. Potomac River to Lower Cedar Point.
- No. 32 June, 1922.. York and James Rivers.
- No. 33 July, 1922.. Delaware Coast, Cape Henlopen to Chincoteague Inlet.
- No. 34 Aug., 1922.. Virginia Coast, Chincoteague to Cape Charles.
- No. 35 Sept., 1922.. North Carolina Coast, Cape Henry to Beaufort.
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MoToR BoatinG has also published a log sheet to fit the standard $8\frac{1}{2}" \times 11"$ loose leaf folder. Each sheet contains spaces for such data as time of passing various aids to navigation, names of aids, magnetic and compass courses, distances, patent log readings, speed of boat, revolutions of motor, wind direction and force, condition of weather and sea, depths of water, fuel, time of high and low water, etc., etc.

Prices

Charts 25 cents each or \$1.50 per set of 12. 36 Charts for \$3.50 (Series C will be sent as published). Log Sheets \$1.00 per set of 50 Sheets.

Loose Leaf Binders (canvas bound) to hold Charts and Log Sheets, \$1.75.

36 Charts, 50 Log Sheets and Loose Leaf Binder to hold Charts and Log Sheets, \$5.00.

MoToR BoatinG

119 West 40th Street,

New York

Miss Victory, a High Speed Hydroplane

(Continued from page 36)

to be clinch fastened with copper clout nails and fastened flush.

Cockpit: Cockpit to have a $\frac{1}{2}$ -inch mahogany coaming flush brass screw fastened. The after end to be of $\frac{3}{8}$ -inch mahogany. There will be a partial bulkhead on station No. 10 which is to be stayed with a cleat on each side fastened to engine stringer. This is to be $\frac{3}{8}$ -inch material and to have cap on top. This bulkhead will carry the steerer, instruments etc. An oak cleat neatly finished shall extend from bulkhead to frame floor to support steerer. There will be a removable seat fitted with a $\frac{5}{8}$ -inch front and 9/16-inch top. This will extend from side to side and be supported on engine stringer on each side. A removable filler to form a back will be fitted. The cockpit will have $\frac{3}{4}$ -inch pine floor boards screw fastened. In addition a $\frac{3}{4}$ by 8-inch floor board will be fitted on each side of the motor to be screw fastened in place.

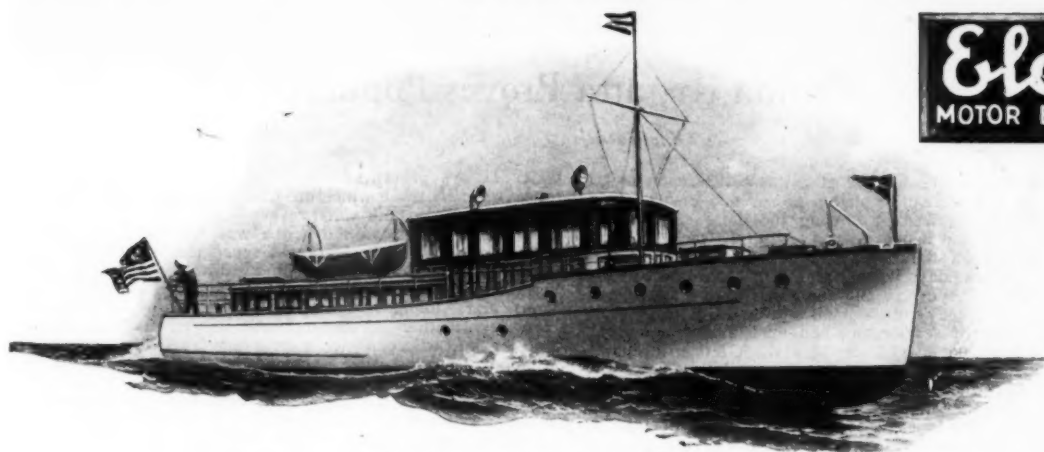
Finishing and Painting: The entire hull is to be thoroughly dressed and sanded. If cedar planking is used it will have a coat of hot oil throughout. This should be two-thirds boiled linseed oil and one-third turpentine applied hot. Seams to be filled with a composition made with dry lead and Valspar. The sides are to be finished with flush seams, blind caulked by making a groove in each plank, and inserting a strand of soft seine twine. The interior of hull is to be painted one coat of lead paint on the inside to the chine line and two coats of color up to the clamp. The outside will have two coats of lead paint to the water line and three coats of Valspar bronze bottom paint. Pot lead may be used if desired. The top sides if painted to have a coat of lead paint followed by two coats of the desired color or enamel. If top sides are mahogany fill properly and then apply three coats of Valspar or equivalent. The decking is to be thoroughly cleaned and the covering board and center plank properly filled. This will be followed with three coats of Valspar. The same treatment will be applied to all natural finish. Seat and floor boards may be painted with two coats of desired color or varnish. All work to be well sanded smooth before applying succeeding coats.

Fender: To be of $1\frac{1}{4}$ -inch half round, either white oak or mahogany. To be screw fastened every 6-inches and holes wood plugged. It is to be slightly tapered toward stem and stern.

Fittings and Equipment: The rudder to be of manganese bronze, special bow type, consisting rudder, special sliding tiller, and stuffing box. A strut of manganese bronze of the stern type and a combination intermediate strut also of manganese bronze. The shaft log will be of the Mechanical Devices Co. pattern KR metal type. Steerer of the scored drum type with an 18-inch wheel. It is to have two 3-inch sheaves forward on one side and one on the opposite side. Cable to lead to opposite side in a direct line with the drum and then directly across the engine stringers using two special type deck blocks. The cable is to be $\frac{1}{4}$ -inch bronze or swedes iron. A turn buckle is to be fitted with the necessary leads so that the line will operate through them.

Gasoline tank will be a 16 by 30-inch seamless steel tank. It is to be well saddled into place and clamped to each stringer with 3/32 by $1\frac{1}{2}$ -inch galvanized iron straps. Deck fittings will consist of a special bow chock, standard forward and aft flag pole socket, one 8-inch hollow type cleat on forward and aft decks, tank filler deck plate, two 6-inch cleats on each side, all to be of polished bronze. A stem band of $\frac{1}{2}$ -inch half round brass will be fitted. Self bailer if used should be installed at the end of each plane and fitted with stem to reach to after deck.

Motor Installation: It will be necessary in this particular design to place the motor aft and drive through a gear. The gear box should be of from $1\frac{1}{4}$ to 1 to $1\frac{1}{2}$ to 1 ratio. This must be securely bolted to oak foundation aligned to suit shaft angles. Straight gear boxes should be connected with the motor through a universal joint. It is advisable to use a flexible joint in the case of the bevel gear type also. The thrust must be taken on the gear box before the shaft goes through the flexible joint. Couple the shaft, the size of which will be determined by the size of motor, to the gear box, align, and babbit both struts. After the motor is connected and aligned perfectly, bolt it down securely. Gasoline connections to be made up in the regular form using air pressure with 5/16-inch pine to the tank, with a $\frac{1}{4}$ -inch lead to the air gauge. Gasoline is to be supplied to $\frac{3}{8}$ -inch copper tubing fitted with S. A. E. compression fittings. Fit a valve at the tank and also at the motor. All wiring is to be arranged in first class order, using such wire as is recommended by the builders of the motor. The exhaust will be disposed of through short stacks attached to the exhaust ports on the machine.

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Florida Regatta Proves Popular

(Continued from page 15)

matter of fact, the owner of Baby Gar was called upon to go into the race on a few hours notice. The Wood-Fisher races were scheduled for the week following the dates set for the Fisher-Allison event but when Aye Aye Sir II sank, making it necessary to call off the event, the Wood-Fisher race was moved forward several days when Gar Wood consented to substitute Baby Gar for Aye Aye Sir and thus make a race. He had been using his speedy runabout all winter down in Florida waters for all kinds of service and had made no special preparation to race thinking he had almost a week left to prepare. But apparently this fact made no difference in Baby Gar's running for she performed 100% perfect.

While it is true that the ocean races for express cruisers did not attract many entries, yet the performances of all the boats which started were perfect. Every craft which made a start finished each race without trouble of any kind, which in itself is a record and demonstrates clearly the state of perfection to which the modern express cruiser has been brought.

The schedule of express cruiser races out of Miami is a hard one, and calls for more than mere child's play to go through with. Miami, situated as it is, directly on the Atlantic Ocean, and its shores being only two miles from the Gulf Stream, which is always rough and tempestuous, assures any one who enters his boat will be certain of a rather grueling experience. But it is just for these reasons, and to demonstrate the worth of small, fast boats in a sea, where conditions are anything but perfect, that these races are scheduled.

Perhaps the most important of the four express cruiser races was the one from Miami to Havana, Cuba. This race, a new one, on the schedule for the first time, was added because it had been thought by some that the boat which won all the express cruiser races a year ago, namely: Gar Jr. II, would not be able to stand the punishment which such a trip to Cuba would call for and that a race which would take the boats over a 250-mile run, some 150 miles off shore and directly across the Gulf Stream, would automatically eliminate the boat from the competition. However, the prophecies of those who believed that Gar Jr. II could not successfully negotiate such a route and show her stern to the other contestants, were all wrong, except that this boat was so far in the lead most of the way that it was impossible for the other contestants to have a good view of her stern.

In a direct line by water, Havana lies nearly 240 miles distant from Miami, in an approximately southwesterly direction. The shortest course between these two points, owing to the geographical formation of the Keys lying south of the Florida Peninsula, makes it necessary to follow down the Coast for seventy miles, where a departure can be taken and one's course laid southwest for Morro Castle at the entrance to Havana Harbor.

The formation of the Keys and the ocean bottom along southern Florida makes an ideal location for motor boat racing, provided one is a good navigator. From the shore line for a distance of two miles off shore, that is, to the edge of the Gulf Stream, the water is very shoal, averaging not over a couple of feet deep. Yet a continuous channel can be found which has a depth of approximately ten feet. This channel, although very crooked, is well marked by government aids to navigation so that the mariner by carefully following his chart and paying attention to his piloting, can negotiate the water over the shoals with safety. Along the edge of the shoals, where they meet the Gulf Stream, the water falls off in depth from a foot or two, to a thousand feet, and a little further out, to a maximum depth of nearly one mile.

The direction of flow of the Gulf Stream is northwest, with a velocity of approximately $3\frac{1}{2}$ miles per hour. The wind, during this time of the year, invariably and constantly blows from the east or northeast, varying in velocity from a minimum of about ten miles an hour to average maximum of about double this amount. On account of this wind constantly blowing against the direction of flow of the Gulf Stream, the latter is always very rough. The seas are very long and of considerable distance between crests, but the whole surface is badly broken up with a very short and choppy formation, superimposed upon the long seas of the Stream. However, when these seas reach the shoal water, they are entirely eliminated and the water flattens out to an almost glassy surface. Therefore, no matter how hard it blows or how high the sea rolls, one is always sure of finding water as smooth as that along a lee shore, along this entire strip of shoals off the Florida Coast. Furthermore, there is no current of any consequence to bother.

In view of the above conditions one will see how advantageous it is, in running a course similar to the one between Miami and Havana, to follow along the shore as far as possible before taking his departure for the Cuban Capital. He thus escapes the adverse current of the Gulf Stream as well as its rough water, which is always present in the winter season. This rough

water always prevents a small cruiser from making its best time, especially those which are able to average better than thirty miles an hour in still water.

The race from Miami to Cuba was scheduled for Saturday, February 25th, and the start was timed for seven o'clock in the morning. Besides Gar Jr. II and Shadow V, the entries included Sea Horse, the new cruiser owned by James A. Allison of Indianapolis, and Altonia II owned by A. C. Newby of Indianapolis. However, neither of these boats showed up for the start. Hoosier VI, whose owner a year ago suggested a race from Miami to Cuba in order to prove the seagoing qualities of the small express cruiser, did not see fit to enter his craft. Therefore, the crews of Gar Jr. II and Shadow V conferred in order to see if it would be well to make a start with only two boats competing. The wind had been blowing east continuously for over a week and on this morning it had taken on new life and was blowing smartly from the same quarter. Therefore, the sea conditions looked none too encouraging, but inasmuch as the members of the Habana Yacht Club were expecting the boats and had made arrangements for a big reception, it was decided to make a start even though only two boats could be found ready to risk the trip.

The starting signal was given at 7:04, and Shadow V and Gar Jr. II went over the line together. On account of the rough water off shore, it was decided to follow down the coast keeping in the smooth water over the shoals until Alligator Reef was reached, some seventy-five miles southwest of the starting point. If upon reaching this point conditions of sea were found to be any better, we decided we would take our departure from Alligator Reef Light, which would make a run of 160 miles from this point due southwest to the entrance of Havana Harbor. The run down the Hawk Channel, which is the name by which the passage over the shoals is known, was full of thrills. The first course of south is held for about twelve miles, but after that, for the next twenty miles, the courses average only one or one-and-a-half miles in length, and with Gar Jr. II averaging thirty miles an hour or two minutes to the mile, this meant keeping a sharp lookout at all times for the various channel marks and turning point. As there is not sufficient water on each side of the entire channel, and should any of the buoys be missed or the turning points mistaken, it meant sure disaster.

The government has marked the Hawk Channel well with can and nun buoys. Yet, on account of the atmospheric conditions in Florida, it is well nigh impossible to keep any paint or numbers on the buoys, therefore it is generally a matter of guess as to whether the buoys are port or starboard, black or red, and as by guessing wrong would throw us on the coral reefs, one will see how much care had to be taken in the courses and times. However, we had these well laid out in advance and although most of the cans and nuns are small and cannot be picked up more than one half a mile away at the most, which means a running time of less than a minute for Gar Jr. II, yet all went well and not a mark was missed.

We reached Alligator Reef Light, 74 miles from the start, at 10 o'clock. This was the point from which we had decided to take our departure from Havana should conditions warrant. However, when we reached this point, the wind was blowing even more freshly, so it was decided to follow along the Keys a little further as this would make our course to Cuba more at right angles to the waves of the Gulf Stream and it is in the trough that Gar Jr. does her best work.

The further down the Coast we ran, the rougher the Gulf Stream appeared to get. As it was only a mile distant from us on our port beam, we could see the size of the rollers, and the outline of them on the horizon made us realize that we were going to be in for at least a ducking before the day was over. But as the thermometer stood at 80 degrees and the temperature of the water was at exactly the same point, such a mere incident as a little green water coming aboard did not bother us. It was just noon when we passed inside American Shoal Light, and at 12:38 Key West Range lined up and we swung our course from W3/8S, which we had been holding for some time, to S3/4E and headed for the Key West Whistler, which was a-beam at 12:49. Here our course was shifted to S S W and the chart showed nothing ahead of us for 100 miles to Morro Castle and the bottom about one-half mile below Gar Jr.'s keel.

As we passed a-beam of the whistler, Gar Jr.'s nose ploughed into the first wave of the Gulf Stream, and just at the moment that much of this flowed off the stern deck, her bow went into the second wave. This performance was repeated at the rate of about sixty a minute for the next three and a half hours. However, aside from the hot shower that we all were constantly taking, all else was comfortable. The waves appeared to be some fifteen feet in height, but as they were 100 feet or more in length, it would have been smooth sailing except for the

(Continued on page 120)

Yard and Shop

(Continued from page 46)

many years ago and a number of different locations have been occupied in this period. The business of Daniel Pratt's son has been carried on for four successive generations by Daniel Pratt, Daniel F. Pratt, Frank W. B. Pratt, and Winthrop E. Pratt. Ninety years have passed and the firm is still building and selling good clocks. In later years ships clocks have been added to their wide assortment and their marine clocks enjoy an enviable reputation.

To Build Hacker Boats

Complying to the many demands for boats built according to the designs by John L. Hacker, being published in *MoToR BoatinG* each month, William Richards is arranging to build these various boats. A new location on the water front of the Hudson River at Dyckman Street has been secured where his established line of boats will be constructed. In addition to the various tenders and sailing canoes a 26-foot V-bottom cruiser and the Hacker boats will be featured. A beginning will be made with the 14-foot runabout Marybelle, the design for which was published in January. The others will follow in due course and in addition knock down frames for these boats will be furnished if the demand warrants. The excellent water front location of this new shop will make it conveniently accessible and marine hardware and boat sundries will be carried.

Sackrider to Manage Marine Department

For the last ten years J. W. Sackrider has been closely identified with the Marine Department of Geo. B. Carpenter & Co. He has recently been placed in charge of the Marine Department as Manager. His broad acquaintance with the trade and his intimate knowledge of the requirements of the lines will enable him to extend and improve the service in many ways. A vigorous renewal of boating activities for the coming season is indicated by all signs and the firm of Carpenter & Co. is better prepared than ever to serve its many clients.

Bear Cats On Display In New York

The show boat of the Belle Isle Boat and Engine Company was sold to Lord Auckland of New York who is going to act as the eastern representative of this company in the states of New Jersey, Connecticut, Rhode Island, and portions of New York and Pennsylvania adjacent to New York City. He has had considerable experience in boats and motors in England. The show boat will be displayed in the show rooms of the Isotta Motors Inc., 19 W. 44th St., New York, N. Y., and when the season opens another boat will be kept in the water so demonstrations can be made at any time.

Thomas Fleming Day, New York, will handle the little Moto-Row boat during the coming year as well as the full line of Davis American dinghies. Full lines of these boats will be carried in his New York show rooms.

The Michigan marine motor will be distributed nationally by the Belle Isle Company and will be aggressively handled throughout the country. This little motor is a single cylinder machine of 4 h.p. in which practically all vital parts are interchangeable with standard Ford parts. The motor has been re-designed during the winter so that it will be an even more satisfactory machine than it was previously. It is an ideal motor for small boats as it is light in weight for the power developed. In New York City, W. C. Disbrow, Jr., of 8 Reade Street, will handle these machines.

McLouth Building Hydroplanes

In order to turn out high speed hydroplanes with the proper workmanship to satisfactorily operate at high speeds, Sydney C. McLouth of Marine City, Mich., has affiliated with the Beebe Brothers, unsurpassed hydroplane builders. Both Beebees were formerly connected with the hydroplane works of the C. C. Smith Co., of Detroit and are regarded as masters of their craft. A little hydroplane of only 16 feet in length is being produced as a stock article and it is so designed that speeds up to 40 m.p.h. will readily be secured with standard marine motors of about 100 h.p.

Questions and Answers on Lesson No. 1

(Continued from page 40)

The following whose papers were received during February, have passed:

LESSON No. 1

Nick Antonion, William L. Brower, Jr., Herbert Galloway, Leonard C. Hall, Louis A. Kumm, Wm. L. Phinney, Stanley C. Wilcox, Roy E. Williams.

LESSON No. 2

Nick Antonion, Albert Gayer, Herbert Galloway, Louis A. Kumm, F. W. Mosteller, Wm. L. Phinney, Stanley C. Wilcox.

LESSON No. 3

Nick Antonion, Charles A. Baker, R. N. Cancienne, K. DeHart, H. J. Hodgdon, Louis A. Kumm, F. W. Mosteller, Mrs. C. A. Philpott, Wm. L. Phinney, Charles Ruder, John P. Turcotte, C. E. Wilson, H. Lloyd Williams, Stanley C. Wilcox.

LESSON No. 4

Nick Antonion, Milton C. Bergey, William Baumgart, A. E. Burgess, K. DeHart, Forrest D. Greene, H. J. Hodgdon, Crawford Hoke, Louis A. Kumm, W. L. Phinney, Charles Ruder, C. E. Wilson, H. Lloyd Williams, Stanley C. Wilcox.

LESSON No. 5

Nick Antonion, A. L. Coffey, Jr., Elsie L. Fenton, Forrest D. Greene, H. J. Hodgdon, Louis A. Kumm, W. B. Moores, Walter Monroe, C. L. Mitchell, Mrs. C. A. Philpott, L. R. Philpott, W. Blood-Smythe, Stanley C. Wilcox.

LESSONS Nos. 6-7

Nick Antonion, Will B. Barnett, E. C. Barnes, H. J. Hodgdon, Stanley C. Wilcox.

LESSON No. 8

E. C. Barnes, Seymour M. Bradley, H. J. Hodgdon, Edwin Kenyon, J. W. King, Louis A. Kumm, Stanley C. Wilcox.

LESSON No. 9

Seymour M. Bradley, Edwin Kenyon.

LESSON No. 10

W. A. Baxter-Gould, John C. Brodhead, Henry Byers, Dr. F. G. Brown, W. R. Broll, Fred H. Campbell, W. J. Gorton, Mrs. E. G. Kaiser, Edwin Kenyon, Chris. H. R. Mulvihill, Jos. Reinhardt, John Reichester, Kurt Roenitz.

LESSON No. 11

Percy Benedict, Dr. F. G. Brown, W. R. Broll, L. L. Crosthwaite, Clarence W. Culver, Fred H. Campbell, H. Greinert, Kenneth Gess, H. J. Hodgdon, Geo. R. Law, Jr., W. B. Moores, Chris. H. R. Mulvihill, P. F. McMahon, Frank Mitchell, Kaspar I. Murphy, G. A. Patrie, George A. Rawson, Kurt Roenitz, Charles Vossbrinck.

LESSON No. 12

R. Andren, Percy Benedict, Dr. A. B. Bennett, Joe Bister, W. G. Boyden, Henrick Boche, John C. Brodhead, W. R. Broll, Dr. F. G. Brown, A. R. Burr, J. Calvert, W. A. Cornell, L. L. Crosthwaite, Clarence W. Culver, Leslie H. Chapman, Fred H. Campbell, Arthur Ek, L. S. Ellsworth, Charles E. Grush, W. C. Gustafson, Geo. D. Granville, Geo. Hanson, H. J. Hodgdon, J. Edwin Jones, George R. Law, Jr., W. B. Landreth, H. A. Morton, W. B. Moores, W. J. Mozart, Chris. H. R. Mulvihill, P. F. McMahon, Edward F. Mathews, Kaspar I. Murphy, L. McKenzie, C. L. Mitchell, G. A. Patrie, Wm. Harry Palmer, George A. Rawson, John Reichester, Edmund Roxby, Morton Steele, J. K. Sexson, Dr. J. F. Schifick, Walter Slocum, F. B. Smith, H. R. Stiles, Miss S. Steinmetz, O. A. Thomas, Alf. A. Thomas, Dr. H. E. Watkins, William O. Yates, C. S. Young.

Requirements for This Summer's Big Racing Events

(Continued from page 44)

ately report to the race committee and be under the absolute control of the race committee until ten minutes before the preparatory signal for the next heat. During the time the boat is under the control of the race committee, no changes, repairs, adjustments or work of any nature upon the power plant, power or accessories is permitted with the exception of fueling.

Boats competing for either of the trophies must exhaust at the stern, close to the waterline. The boats must be fitted with at least three transverse bulkheads, have the motor compartments entirely closed in, and have seating accommodations for at least four persons. The boats must be equipped with an efficient means of idling or reversing each propeller and the motors must be fitted with an efficient self-starter.

The hulls of the competing boats must have no brakes in the longitudinal continuity of the immersed surface, not more than one lifting surface and must conform to the committee's ideas of what is generally termed a displacement boat. The hulls of the boats competing for the Wood-Fisher Trophy, must be so built that the keel and chine or bilge will be continuous and extend from the bow to the stern or sternpost. Steps either transverse or longitudinal, are not permitted. Surfaces on each side of the keel line between the keel and the chine or bilge must be continuous and not contain brakes, jogs, or notches of any description.

After January 1st, 1923, the piston displacement limitation in the boats competing for the Fisher-Allison Trophy will be reduced to 1,600 cubic inches. The form of power plant also will be limited to one stock marine motor.



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Use Cooling Water Over Again

(Continued from page 38)

the plan shown, although somewhat more expensive to rig up, is I believe easily worth the difference in the results obtained.

When valves are placed in the overflow or discharge pipes of a pump some provision should be made to prevent accidental closing which would prove disastrous. One way to do this is to file or grind a flat on the valve so it will not seat tight. A lump of solder on the valve seat would also prevent closing.

C. H. C., Saginaw, Mich.

No Economy in Mixed Fuels

(Continued from page 39)

and crankcase by sight feed cups or by a mechanical oiler instead of with the fuel. Otherwise faulty lubrication and its troubles are certain to occur.

Another annoying difficulty with kerosene is that it very often causes a knock exactly like that experienced from excessive carbon deposits. To overcome this, fresh water must be injected

into the intake manifold or the compression must be reduced, usually by inserting a thick gasket between the cylinders and the crankcase. This will reduce the power slightly.

Less important but nevertheless objectionable features connected with the use of kerosene are its lasting odor when spilled, the general nuisance of using two fuels, with separate tanks and piping in order to provide gasoline for starting and the difficulty of starting when the engine is shut off with kerosene in the carburetor.

For boats used in commercial work operating more or less continually, the saving which can be made by using kerosene amply justifies the expense of installing special exhaust heated manifolds on four-cycle engines and special injection devices on two-cycle engines to permit the efficient use of the heavy fuel alone without gasoline except for starting. Lubrication can be given special care and the other objections become relatively unimportant.

G. A. R., New York, N. Y.

Changes Are Necessary

FROM my own experience it would seem quite possible to use a gasoline-kerosene mixture in the ordinary gasoline marine engine, usually by making a few necessary changes or additions.

Considering that there are any number of tractor engines of a size and speed similar to that of the ordinary medium speed marine engines, operating day after day on kerosene alone, there is no reason to believe that marine engines would not run successfully on a mixture of gasoline and kerosene or even kerosene if arranged with means for supplying the necessary heat to vaporize this heavy fuel. The condition of operation in the average boat—continuous full power most of the time—is even more favorable for the use of heavy fuel than the service the tractor engine is called on to perform.

In order to successfully use this kerosene mixture, warm air should be supplied to the carburetor from around the hot exhaust pipe and the intake manifold should also be heated or provided with a "hot spot" to help vaporize the fuel. The temperature of the circulating water should also be controlled or regulated so that it will leave the cylinder jackets at about 200° to 212° F., a somewhat higher temperature than is usual in ordinary marine engine practice.

Of course sufficient heat must be supplied in some way to thoroughly vaporize the mixture, providing for complete combustion within the cylinder; otherwise, should condensation take place, the unburned portion of the fuel is likely to find its way into the crankcase, diluting the oil and causing lubricating trouble when a splash or circulating system of oiling is used.

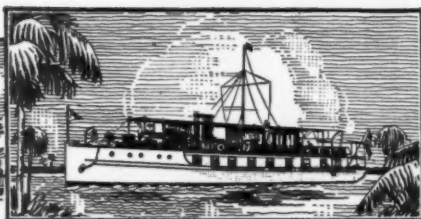
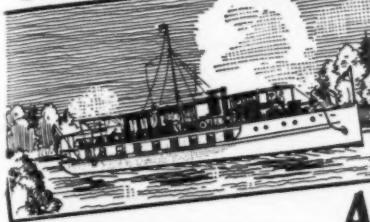
At one time I conducted a few experiments along this line on my own motor, a medium speed two-cylinder four-cycle machine. The carburetor was a Schebler with a water jacket partly around the throttle. Running warm water through this jacket made no perceptible difference in operation of motor, so this plan was abandoned and hot exhaust used in place of water. This was secured by tapping the exhaust pipe near the engine for a 1/2" nipple which projected into the exhaust pipe about one inch. This nipple was sawed off on an angle so that in operation it acted like a small baffle plate, forcing a portion of the exhaust through the nipple. This was connected with carburetor by using 1/2" copper tubing and the regular connectors, as these were the largest fittings that would go into the 1/2" pipe size holes in the carburetor jacket. The outlet from this jacket was piped aft and overboard like a regular exhaust. Warm air was supplied to the carburetor from around the exhaust pipe and with no other changes, a fifty-fifty mixture of gasoline and kerosene was tried out. To my surprise the motor ran quite as well as with the regular low test gasoline. Revolutions were tested and a speed reduction of only five or six turns a minute was noted, a loss of power hardly worth considering. The boat had two tanks and I expected to start on gasoline and then switch to the mixture but found it only necessary to prime with gasoline when the motor started easily and ran steadily.

This gasoline-kerosene mixture was used throughout the season until quite late when the water and air became colder. Then it began to give trouble and was abandoned. The 1/2" copper pipe was altogether too small as it supplied insufficient heat and gradually filled up. Also the circulating water should have been arranged so the temperature could be regulated and maintained near the boiling point. The success of this experiment leads to the belief that with a larger exhaust pipe leading to a jacketed section of the intake manifold and proper regulation of the cooling system a fifty-fifty mixture could be used with entire satisfaction and a considerable saving in the season's fuel bill.

To prevent pre-ignition and reduce carbon, a small amount of water vapor is usually furnished with the mixture.

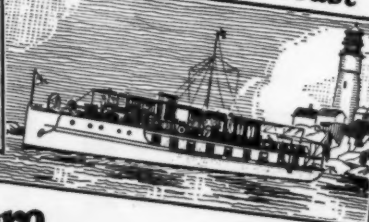
C. H. C., Saginaw, Mich.

On the St. Lawrence

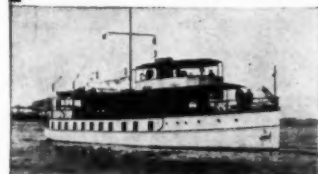


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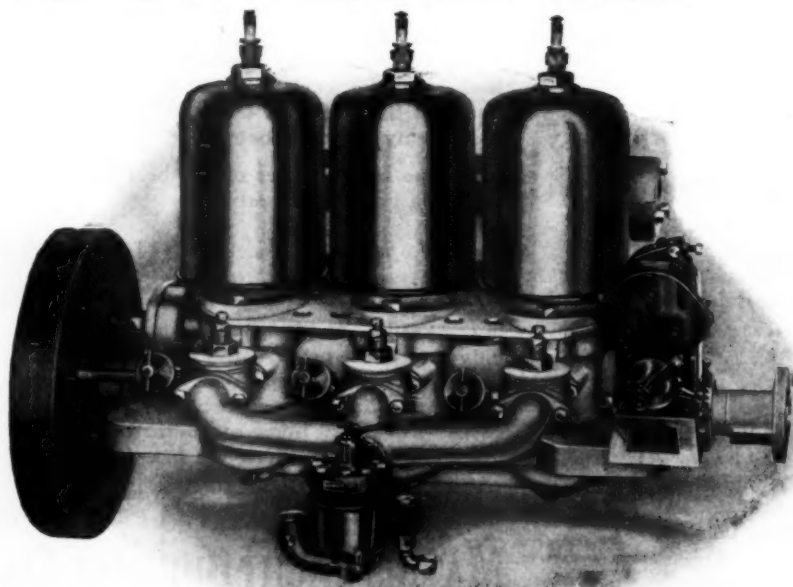
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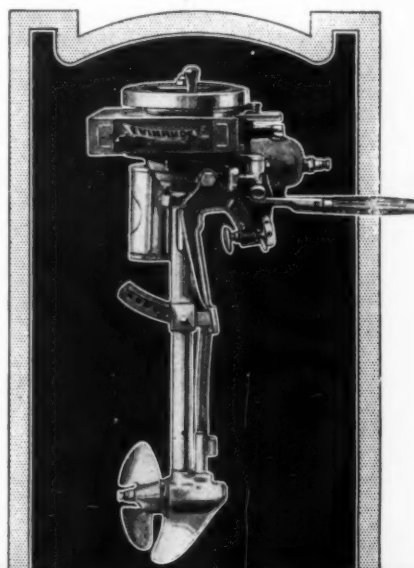
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Florida Regatta Proves Popular

(Continued from page 114)

Results of Miami Races

Race for Wood-Fisher Trophy
Three Heats of 50 Miles Each

| Boat | Owner | Power | Time | Time | Time | Speed | Speed | Speed |
|----------|----------|---------------------|----------|----------|----------|----------|----------|----------|
| | | | 1st Heat | 2nd Heat | 3rd Heat | 1st Heat | 2nd Heat | 3rd Heat |
| Baby Gar | Gar Wood | 450 h.p. Liberty | 1-23-14 | 1-15-07 | | 36.0 | 40.0 | 40.6 |
| Adieu | Webb Jay | 250 h.p. Hall Scott | | | | | | |

¹ Withdrew after completing 20 miles.
² Withdrew after completing 20 miles.

³ Called in by Committee after completing 26 miles.
⁴ Withdrew after 4th mile.

**Free-for-All Runabout Race
20 Miles**

| Boat | Owner | Time | Speed |
|-------------|----------------|-------|-------|
| Sue J. | Webb Jay | 47-00 | 25.6 |
| Hoosier IV. | Paul Andre | 47-13 | 25.4 |
| Tramp | Col. Dickinson | 49-51 | 24.1 |

**Chance Race
1 Heat, 4 Miles**

| | | |
|----|---------------|---------------------|
| 1 | Baby Gar | Gar Wood |
| 2 | Sue J. | Webb Jay |
| 3 | Tramp | Col. Dickinson |
| 4 | Shadow V | Carl Fisher |
| 5 | Speedalong | J. Fleishman |
| 6 | Margaret | H. E. Rogers |
| 7 | Boomerang | H. Wyeth |
| 8 | Sea Horse | J. A. Allison |
| 9 | Helaimgra | E. A. Lindberg |
| 10 | Let's Go | Dorns Boat Livery |
| 11 | Anna S. | C. Smith |
| 12 | Seminole | J. S. Phillips |
| 13 | Phoebe | D. M. Marshall |
| 14 | Corsair | C. E. Pease |
| 15 | Marie S. | Campbell & Thompson |
| 16 | Mecca | A. A. Ericson |
| 17 | Elsie May | J. C. Baker |
| 18 | Illaaso | J. Jensen |
| 19 | Trilby | F. C. Bache |
| 20 | Coscy | O. A. Ham |
| 21 | Corsair Jr. | C. Pease |
| 22 | Millie | L. Dodge |
| 23 | Avia | W. E. Martin |
| 24 | Lilly L. | J. Burkhardt |
| 25 | Weona II. Jr. | W. J. Henry |
| 26 | Sea Robin | J. J. Rampe |
| 27 | V 8669 | H. Pruden |
| 28 | V 9279 | H. Zinkund |
| 29 | Lena | Ed. Miller |

**Handicap Cruiser Race
2 Heats of 10 Miles. 1 Heat of 4 Miles**

| Boat | Owner | Time | Time | Time |
|-----------|---------------|----------|----------|----------|
| | | 1st Heat | 2nd Heat | 3rd Heat |
| Boomerang | H. Wyeth | 57-57 | 34-21 | 14-54 |
| Anna S. | C. Smith | 1-02-41 | 58-19 | 23-50 |
| Helaimgra | J. W. McLaren | 1-02-40½ | 58-51 | 25-10 |

**Miami to Palm Beach and Return
129 Miles. February 23, 1922**

| Boat | Owner | Time | Speed |
|-------------|---------------|----------|-------|
| Gar Jr. II. | Gar Wood | 4-34-26½ | 28.2 |
| Shadow V. | C. G. Fisher | 5-39-05 | 22.8 |
| Sea Horse | J. A. Allison | 6-28-30 | 19.9 |

**Miami to Havana
240 Miles. February 25, 1922**

| Boat | Owner | Time | Speed |
|-------------|--------------|----------|-------|
| Gar Jr. II. | Gar Wood | 9-23-00 | 25.6 |
| Shadow V. | C. G. Fisher | 13-13-00 | 18.1 |

**Key West to Miami
154 Miles. March 1, 1922**

| Boat | Owner | Time | Speed |
|-------------|--------------|---------|-------|
| Gar Jr. II. | Gar Wood | 5-02-30 | 30.54 |
| Shadow V. | C. G. Fisher | 6-31-45 | 23.58 |

**Havana to Key West
105 Miles. February 28, 1922**

| Boat | Owner | Time | Speed |
|-------------|--------------|---------|-------|
| Gar Jr. II. | Gar Wood | 4-18-32 | 24.4 |
| Shadow V. | C. G. Fisher | 4-56-35 | 21.2 |

**Race for Fish Boats
One Heat, 4 miles**

| Boat | Owner | Time |
|----------|----------------|-------|
| Trilby | F. C. Bache | 26-56 |
| Lilly B. | John Burkhardt | 36-44 |
| Nellie | L. Dodge | 34-39 |
| V 9279 | H. Zinkund | 37-33 |

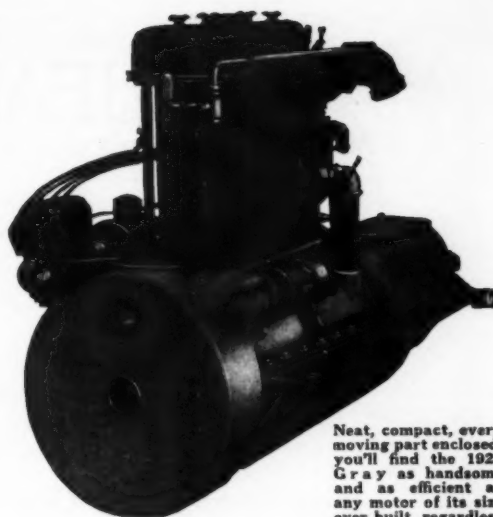
(Continued on page 122)

A Better Engine for Your Boat

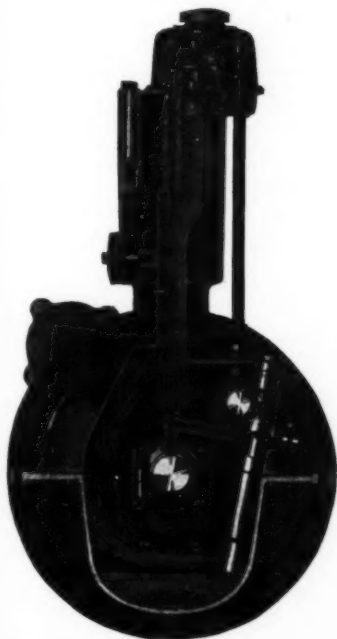
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THE 1922 Gray is neat in appearance, compact, and can easily and inexpensively be installed in runabouts 20 to 30 ft. in length; small cruisers up to 34 ft., also work boats.

Note the rigid one-piece base with Reverse Gear enclosed. The gear is automatically lubricated with positive gear pump that lubricates all other internal working parts of the engine—no grease cups or thick transmission oil used.



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Oil filler is conveniently located on top of engine with duct leading to Crank Case. Rocker arm shaft is hollow and automatically supplies oil to Rocker Arms. Oil is forced under pressure to the three main bearings, and to the connecting rod troughs.

In brief, the Gray Oiling System leaves nothing to chance. It is unfailing at all engine speeds, and all oil is kept inside the engine, and not thrown around the boat or on its occupants.

The fly wheel is enclosed, affording safety and cleanliness. Bilge water cannot be thrown by the fly wheel. Every working part is enclosed; even the push rods. Due to the special design of the Cam Shaft, push rods and rocker arms, scarcely a sound can be heard with ear close to the engine.

The smooth, quiet operation of the new Gray improved Valve-in-Head at all speeds from 200 to 2000 would compare favorably to an electric motor. It runs most economically on low grade gasoline and satisfactorily on kerosene.

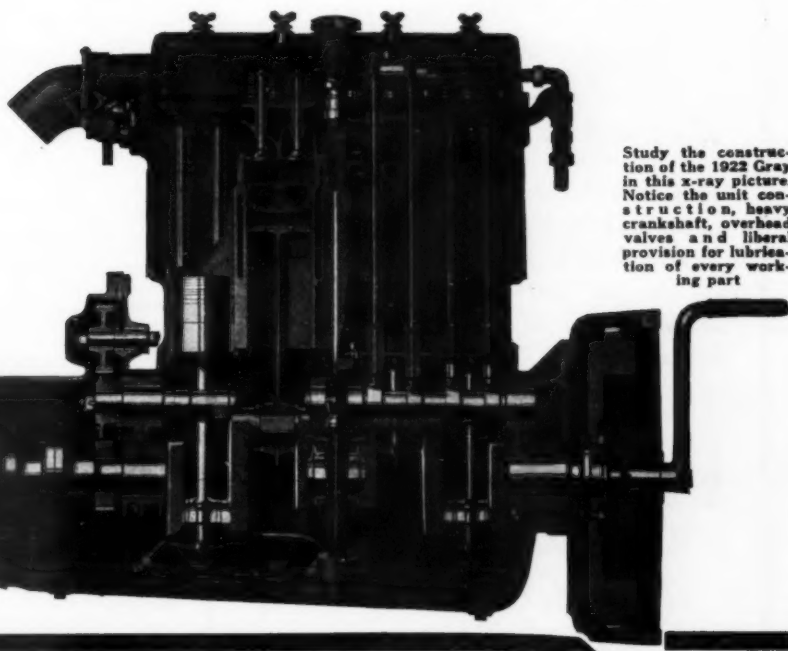
Note The Big Crankshaft

The diameter of the main bearings are: Front $2\frac{1}{8}$ ". Center $2\frac{1}{16}$ ". Rear 2". The lengths are $3\frac{3}{4}$ ", $2\frac{1}{2}$ ", $2\frac{1}{2}$ " respectively. Crankshaft is 40-50 point carbon steel forging, heat treated and ground.

Special attention is given to the balancing. The shaft is put in rotative as well as static balance on an Akimoff Dynamic Balance Machine, reducing vibration to a minimum.

Bosch Magneto with Impulse Starter, also Bosch two unit Starter and Generator is used.

Gray Two-Cycle Motors are built in models from 3 to 8 h.p.



Study the construction of the 1922 Gray in this x-ray picture. Notice the unit construction, heavy crankshaft, overhead valves and liberal provision for lubrication of every working part

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Florida Regatta Proves Popular

(Continued from page 120)

chop caused by the wind and current flowing in opposite directions. At times when we were going up the steep side of a wave, it would seem that the motors which were normally running at 1200 revolutions a minute, would almost stop. But then we would reach the top of the wave and begin our descent, and no tobogganing on the ice could compare with the thrill. Our course was not quite in the trough and at no time was it necessary to slow down the motors or in any way adjust them. In fact, no one entered the engine room during the entire trip across the Gulf Stream, a distance of 100 miles, which was made in a little over three hours' time.

When about fifty miles from land in any direction, one of the flying boats in the Key West-Havana service passed about twenty feet directly over us. This was a very comfortable thing as it showed us that the course we had laid from Key West to Havana, was correct, and that neither the wind, which was pushing us in a southwesterly direction, or the current, which was tending to make us slide northeasterly, had caused a greater result than we had figured in advance.

At five minutes after four, the Highlands of Cuba were picked up and then speculation began as to how near the entrance to Havana Harbor we were headed. As none of the crew had ever been into this port before, and as the northern coast of Cuba has no land marks which would be recognized, other than Morro Castle, at the entrance to Havana, it meant quite a little to us to have held our course as we had anticipated. It was not many minutes before smoke was seen on the horizon and we judged this to be from the city's manufacturing plants. This was directly ahead of us and we decided to hold the same course a little longer until we could more surely locate our position. In another three minutes, Morro Castle came into view directly ahead, and we knew that the finish line was not far distant.

At 4:28, amidst the booming of cannon and the blowing of all the whistles in Havana, we crossed the finish line. Havana's well known sea wall was black with people lined several tiers deep, and they told us they had been waiting there all afternoon to see the boats finish. Apparently they seemed satisfied and rewarded for their long wait.

The officers and many of the members of the Habana Yacht Club were at the finish line waiting to greet Gar Wood and his famous cruiser. Commodore Peter Morales was the first to come aboard and extend the hospitality of his club to the owner and crew of Gar Jr. With him was Rafael Passo, Chairman of the House Committee of the Habana Yacht Club and the most hospitable host that the world knows. Others who came aboard included Oscar H. Massaguer, S. Mliverri, J. Mestre, John Rivera, Raulin Calvea, besides many others too numerous to mention.

From the moment Gar Jr. II crossed the finish line we were taken charge of by the officers of the Habana Yacht Club, and our every wish satisfied. There was not a thing or item which we wished for that was not done for us.

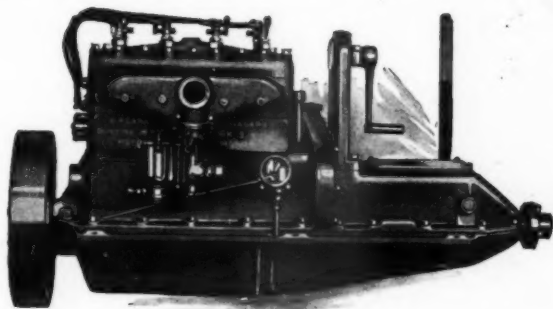
The crew of Gar Jr. consisted of Commodore Gar Wood and his brother Win; Claude Grahame-White of London, England, and the writer. Joseph Kinney acted in his usual position of mechanic and saw to it that the motors gave the service which is demanded in a race of this kind. However, Mr. Kinney did not have much to do as the motors took care of themselves and ran without trouble or attention of any kind. Mr. Grahame-White, it will be remembered, was the first person to fly around the Statue of Liberty at New York, and the first one to circle Boston Light in an aeroplane. During some of the thrills which were experienced, while crossing the Gulf Stream, Mr. Grahame-White stated that they beat anything which he had every experienced in the early days of flying before it became a perfected science which it is today.

Gar Jr. II also won the three other long distance cruising events, namely: the race from Miami to Palm Beach and return; from Havana to Key West; and from Key West to Miami. In all these events, Gar Jr. lead from start to finish and no motor trouble of any kind was experienced, although the engines were run at 1200 revolutions a minute or better all the way. A complete summary of the times and speeds made in all of these events, will be found elsewhere in this issue.

A number of other races in connection with the Miami Regatta were attempted, but with the exception of the chance race, the entry list was not particularly large. In this latter race, twenty-nine boats finished. In the drawing for prizes, oddly enough, Sea Horse Jr., owned by James A. Allison, the boat which finished eighth, won first prize, and the twenty-first boat to finish, Corsair Jr., owned by Charles Pease, was awarded second prize. The boat coming in fourteenth, Corsair, also owned by Mr. Pease, drew third prize. Baby Gar, owned by Gar Wood, finished first in the chance race, but the best he could get in the drawing for prizes was twelfth prize. Sue J., owned by Webb Jay, finished in second place, and he drew ninth prize.

(Continued on page 126)

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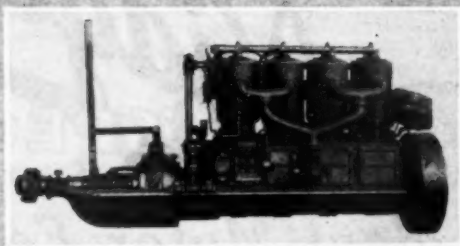
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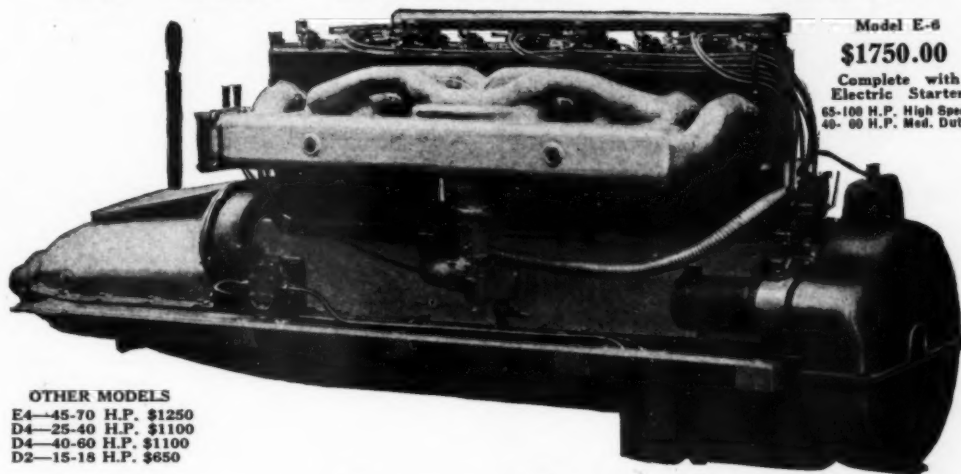


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The new SCRIPPS Hot Spot Manifold subdues low test gasoline. Absolute vaporization, equal distribution and perfect combustion make the new E-6 the ideal motor.

The uninterrupted flow of power of the overlapping power impulses is now a reality at any and all motor speeds—no loading up—no lean periods—no missing—but all six cylinders firing evenly at every spark and throttle position.

Every drop of fuel is used to the maximum and this automatically produces greater power than previously obtained from the same piston displacement and sets a new mark in economy. Think of consumption on low grade fuel of 6/10 lbs. or approximately 1/2 pint per horsepower hour.

The ignition has likewise been greatly refined. Standard ignition is by magneto, two spark plugs are supplied in each cylinder so that practically every personal preference in ignition can be supplied at a slight additional expense—two spark magneto—two spark distributor or for cruiser or off shore two separate and distinct systems, magneto and distributor.

The Model E-6 is strictly up to the minute in modern refinement, nothing smoother, cleaner or quieter is possible, tremendous power under perfect control and top speed or trolling at the operator's command. At the same time it is faithful to the SCRIPPS time proven traditions, insisting upon, above all, stamina, durability and reliability—oversize crankshaft and bearings, automatic pressure lubrication thruout, honest craftsmanship, precision methods, excellence in material and fittings.

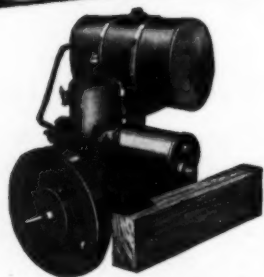
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This complete little power plant can be easily installed by yourself in your rowboat, dingey or canoe with a few common tools. It develops 2 H. P. Will drive canoe 10 to 15 miles per hour—rowboat 7 to 10 miles. Weight, 40 lbs. Compact design. Measures 9 3/4 x 12 inches. Comes complete with propeller, shaft, stuffing box and gasoline tank. Send for details. Dealers wanted. We build marine motors up to 20 H. P. Ask for special literature.

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Florida Regatta Proves Popular

(Continued from page 122)

The Free for All Runabout race was won by Sue J., owned by Webb Jay of Miami and Chicago, with Hoosier IV finishing second, and Tramp, third. In the Handicap cruiser race of three heats, Boomerang, owned by H. Wyeth, finished first. In the race for Fish Boats, Trilby, owned by F. C. Bache, finished first, but she was disqualified as being ineligible for this class, and Nellie, owned by L. Dodge, was awarded first money. A complete summary of these races will be found on page 120.

Mention should be made of the work of those who formed the race committee. While a number of Northern yachtsmen were asked to go South at their own expense to assist the Southerners in the management of the regatta, yet they received little or no assistance from the local motor boatmen. Much of the success of the regatta is due to the efforts of Commodore Schantz of Detroit, who spent nearly the entire winter in Miami, working on the race details. Associated with Commodore Schantz in the active work, were such men as Commodore M. S. Cornell of Middletown, Connecticut; Commodore J. P. Stoltz of New York City; Commodore Eugene Quigley of Cleveland, Ohio; Commodore L. A. Fletcher of Buffalo; H. H. Miller of New York, and Commodore A. McLeod of Detroit. Mr. Guy W. Livingston, Secretary of the Miami Beach Chamber of Commerce, and Mr. C. W. Chase, Jr., did all in their power to make the regatta successful.

What Shall We Do This Spring?

(Continued from page 68)

For new work or wood which has been cleaned down to the surface, a priming coat consisting of a mixture of one part raw linseed oil and two parts of gasoline should be applied hot. This is not to be heated over an open flame, but rather by immersing the container in a bucket of boiling water. This should be applied at least a week before any further work is done, and will serve to satisfy the porosity of the wood and enable the varnish to adhere more firmly.

The second coat should be a coat of good varnish diluted in the proportion of one part of turpentine to two parts of varnish. This will also soak into the wood and apparently will appear to have been wasted effort. For good work, however, this is essential, as the finished coats will adhere very firmly and insure a lasting result. This should be followed after several days with a coat of straight varnish, allowing again ample time for it to dry properly. Each coat should be rubbed down lightly with very fine steel wool before the succeeding coats are applied. The finishing coat is finally flowed on, allowing two full days for it to dry, after which the boat should be ready for service and the varnish finish be good for a full season of hard wear. On exceedingly fine work the next to the last coat may be rubbed with powdered pumice stone and water. This is applied by means of a felt pad which is kept saturated with water. Pumice and oil should not be used for rubbing, as the oil softens the varnish and clouds the finish. The proper method is to wet the work, sprinkle on a little powdered pumice, dip the saturated felt pad into the pumice, and rub the surface. Use lots of water and always rub with the grain of the wood. Care should be observed not to rub too hard or too long, as the surface of the varnish may be rubbed through, requiring an extra coat. Some varnishes do not rub down as well as others. A varnish which rubs well is too hard and inelastic to stand up well under outdoor conditions. For exterior work it is better not to rub down the work at all, as very fine steel wool will remove any traces of roughness and leave the main body of the varnish intact. Another essential for good work is to use clean brushes, clean surfaces, and clean containers for the varnish.

Before finally calling the overhauling completed it is advisable to examine into the condition of metal fittings and other hidden portions of the equipment. For example, the steering cable is a very essential item for the safety of the boat and is generally neglected until it breaks. Unfortunately, it will never break on a calm, quiet day when the boat could drift for hours without interference. We have never known a steering cable to break except in a gale and when the boat was maneuvering in a crowded anchorage. Connections to gasoline tanks, water piping, and water circulating system can all be examined at this time with profit, as any small leakages can be readily corrected. Another important item is the galley equipment, notably the stove. Many of those using alcohol as fuel feed by means of a wick which may be either in the form of a bundle of wires or else an asbestos wick. There is a tendency for these to become clogged up and in order to have the stove ready for operation these should be properly cleaned.

OUTFITTING

Getting the boat into commission is a most important job, because the pleasure you will obtain from your craft this summer depends upon the way it is done.

In this connection let us say that our experience and service can be of great aid to you.

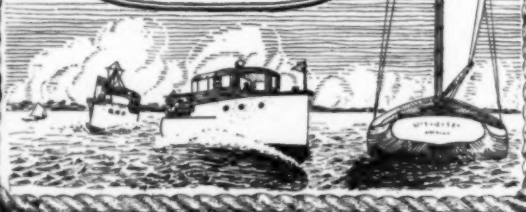
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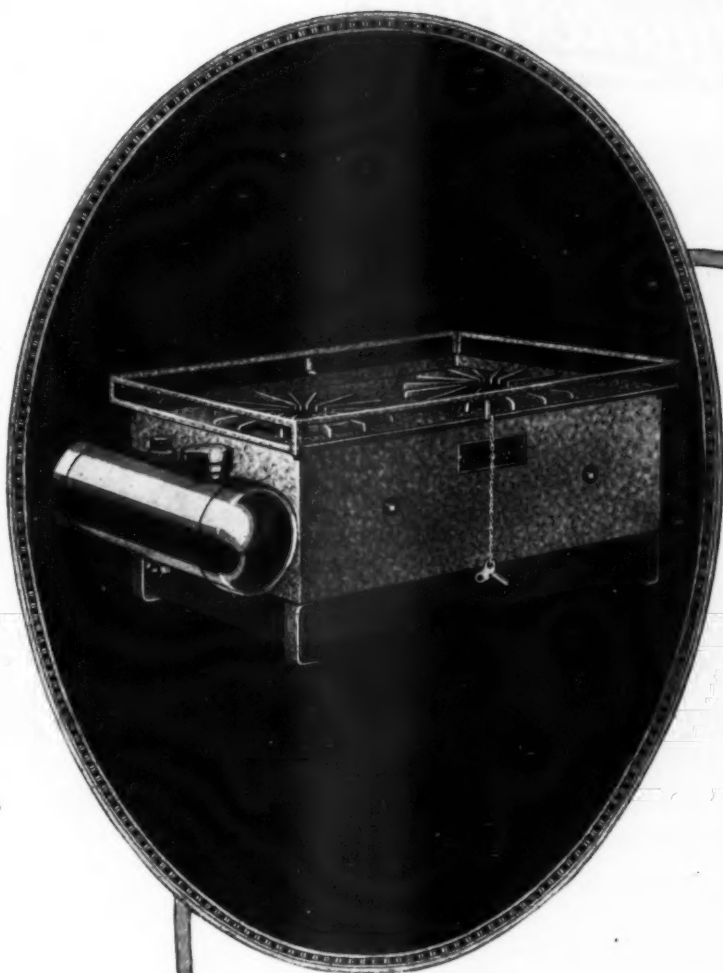
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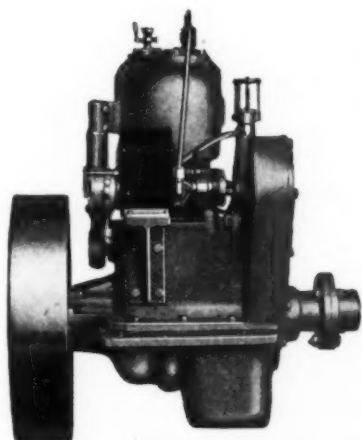
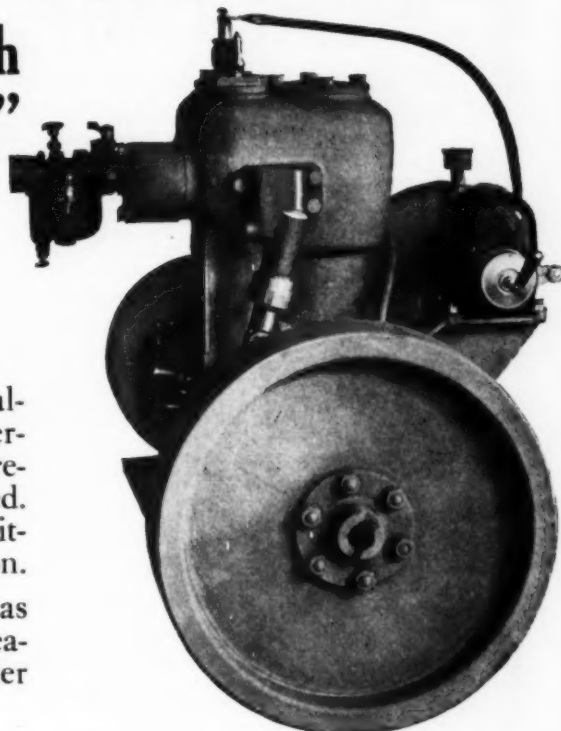
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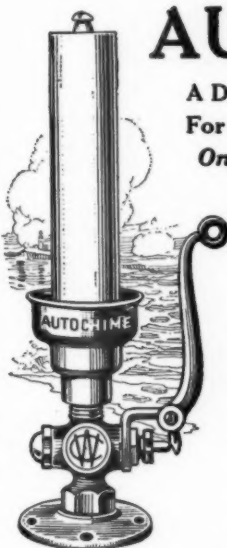
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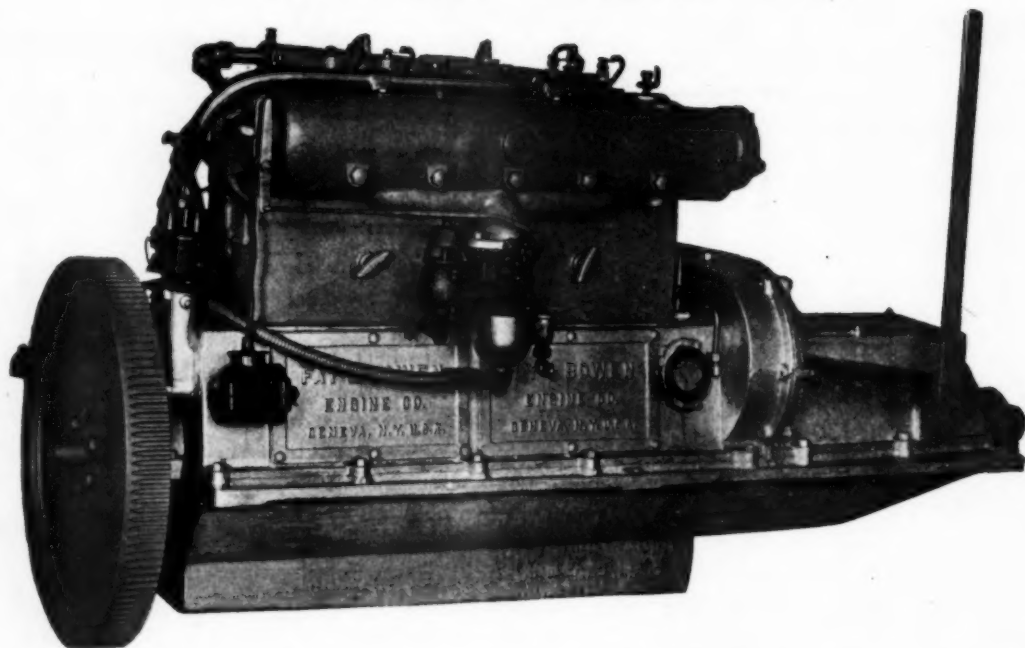
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